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HAZARD RANKING SYSTEM DOCUMENTATION PACKAGE
ICELAND COIN LAUNDRY AREA GROUND WATER PLUME
VINELAND, CUMBERLAND, NEW JERSEY

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

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OSWER/OERR State, Tribal, and Site Identification Center Washington, DC 20460

ICELAND COIN LAUNDRY AREA GROUND WATER PLUME
Vineland, New Jersey

The Iceland Coin Laundry Area Ground Water Plume site is an area of contaminated ground water located in a commercial/residential area of the City of Vineland, Cumberland County, New Jersey. Based on a review of analytical data from ground water samples collected in the area, the contaminated ground water plume area encompasses South Delsea Drive, Dirk Drive, Garrison Road, Lois Lane, South Orchard Road, West Elmer Road, and West Korff Drive.

On three occasions, between September 1987 and October 1990, ground water samples were collected from a drinking water well located at 1276 Garrison Road by the Vineland City Health Department. Analytical results from these samples indicated the presence of volatile organic compounds (VOCs) exceeding State and Federal Maximum Contaminant Levels (MCLs). Subsequently, the Vineland City Health Department collected drinking water well samples from 55 residences located in the area between December 1990 and September 1991. Analytical results from these sampling activities indicated the presence of VOCs, primarily tetrachloroethylene (PCE). PCE was detected above the State and Federal MCL in 16 of these 21 wells.

As a result of the private well contamination, the New Jersey Department of Environmental Protection (NJDEP) installed point of entry treatment (POET) units to the affected residences as a temporary remedial measure until public supply water mains could be extended to the area. Public supply water mains were extended to these areas in 1994. Currently, not all residences are connected to the public supply.

In 1995-1996, the NJDEP conducted an expanded site investigation (ESI) at the former Iceland Coin Laundry and Dry Cleaning facility. This investigation included subsurface soil and ground water sampling. The results of soil sampling conducted in November 1995 showed PCE concentrations up to 8 micrograms per kilogram (ug/kg). Analytical results of ground water samples collected from on- and off-site direct push borings in November 1995 and May 1996 indicated PCE concentrations at concentrations up to 489 micrograms per liter (ug/L).

The Iceland Coin Laundry Area Ground Water Plume site consists of one waste source: a PCE-contaminated ground water plume. The former Iceland Coin Laundry and Dry Cleaners facility contributes to the ground water contamination in the area. In addition, PCE was also detected in samples collected from areas not expected to be impacted by the Iceland facility, which may suggest the possibility of other sources contaminating the ground water.

The release of PCE to ground water is documented by the chemical analyses of ground water samples collected from private residential wells by the Vineland City Health Department in 1990-1991. Drinking water contamination is documented for 16 wells, which serve a total of approximately 44 people. The release of PCE to ground water is also documented by chemical analyses of ground water samples collected from direct push borings during the NJDEP ESI conducted at the former Iceland Coin Laundry and Dry Cleaning facility in 1995-1996. Drinking water, within the site's 4-mile radius, is derived from public supply wells and private wells screened in the Kirkwood-Cohansey Aquifer System, which is the aquifer of concern. Potable wells within 4 miles of the site, and drawing from the aquifer of concern, serve an approximate population of 28,770 people.

[The description of the site (release) is based on information available at the time the site was scored. The description may change as additional information is gathered on the sources and extent of contamination. See 56 FR 5600, February 11. 1991, or subsequent FR notices.]

SITE SUMMARY

The Iceland Coin Laundry Area Ground Water Plume site is a contaminated ground water plume located in a commercial/residential area of the City of Vineland, Cumberland County, New Jersey. The site is located in the vicinity of the former Iceland Coin Laundry and Dry Cleaning facility, which is located on 1888 South Delsea Drive. Based on a review of analytical data from ground water samples collected in the area, the contaminated ground water plume area encompasses South Delsea Drive, Dirk Drive, Garrison Road, Lois Lane, South Orchard Road, West Elmer Road, and West Korff Drive.

On three occasions, between September 1987 and October 1990, ground water samples were collected from a potable well located on 1276 Garrison Road by the Vineland City Health Department. Analytical results from these samples indicated the presence of volatile organic compounds (VOCs) exceeding State and Federal Maximum Contaminant Levels (MCLs). Subsequently, the Vineland City Health Department collected potable well samples from 55 residences located in the area between December 1990 to September 1991. Analytical results from these sampling activities indicated the presence of VOCs, primarily tetrachloroethylene (PCE), at concentrations above State and Federal MCLs in 16 of the 55 residences sampled.

As a result of the private well contamination, the New Jersey Department of Environmental Protection (NJDEP) installed point of entry treatment (POET) units to the affected residences as a temporary remedial measure until public supply water mains could be extended to the area. Public supply water mains were extended to these areas in 1994.

In 1995-1996, the NJDEP conducted an expanded site investigation (ESI) at the former Iceland Coin Laundry and Dry Cleaning facility. This investigation included subsurface soil and ground water sampling. The results of soil sampling conducted in November 1995 showed PCE concentrations up to 8 micrograms per kilogram (ug/kg). Analytical results of ground water samples collected from on- and off-site direct push method borings in November 1995 and May 1996, indicated PCE concentrations at concentrations up to 489 micrograms per liter (ug/L).

The Iceland Coin Laundry Area Ground Water Plume site consists of one waste source: a PCE-contaminated ground water plume. Although analytical data suggests that the former Iceland Coin Laundry and Dry Cleaners facility could be contributing to the ground water contamination in the area, PCE was also detected samples collected from areas not expected to be impacted by the Iceland facility, indicating that other sources may also be contributing to the contaminated ground water in the area. In 1991, the NJDEP conducted a soil gas survey in the area of the former Iceland facility. PCE was detected in locations upgradient and sidegradient of the former Iceland facility at concentrations ranging from 2.1 ppb to 1,233 ppb. PCE was also detected in upgradient and sidegradient ground water samples collected during the ESI conducted by NJDEP. During this investigation, portable gas chromatograph results of these background ground water samples indicated the presence of PCE at concentrations up to 6.471 ppb.

An observed release of PCE to ground water is documented by the chemical analyses of ground water samples collected from private residential wells by the Vineland City Health Department in 1990-1991. Level I contamination is documented for 16 wells, which serve a total of approximately 44 people. An observed release of PCE to ground water is also documented by chemical analyses of ground water samples collected from direct push method borings during the NJDEP ESI conducted at the former Iceland Coin Laundry and Dry Cleaning facility in 1995-1996. Drinking water, within the site's 4-mile radius, is derived from public supply wells and private wells screened in the Kirkwood-Cohansey Aquifer System, which is the aquifer of concern. Potable wells within 4 miles of the site, and drawing from the aquifer of concern, serve an approximate population of 31,883 people.

HRS DOCUMENTATION RECORD--REVIEW COVER SHEET

Name of Site: Iceland Coin Laundry Area Ground Water Plume

Contact Persons

Site Investigation:
Andrew Cyr (609) 584-4276
New Jersey Department of Environmental Protection
Trenton, NJ

Documentation Record:
Dennis Munhall (212) 637-4343
U.S. Environmental Protection Agency
New York, NY

Dennis J. Foerter (732) 225-6116
Region II START % Roy F. Weston, Inc.
Edison, NJ

Pathways, Components, or Threats Not Evaluated

The Surface Water, Soil Exposure, and Air Pathways were not evaluated because the site score would not be significantly impacted by those pathways.

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HRS DOCUMENTATION RECORD

Name of Site: Iceland Coin Laundry Area Ground Water Plume

EPA Region: 2 Date Prepared: July 1999

Street Address of Site: 1888 South Delsea Drive, Vineland, NJ

County and State: Cumberland, NJ

General Location in the State: Southwest

Topographic Map: Milleville, N.J., quadrangle, 1953 (photorevised 1986)

Latitude: 39° 27' 26.1" North Longitude: 75° 02' 50.1" West

(Ref. 4)

EPA ID No.: NJD0001360882

Scores

Ground Water Pathway	60.60
Surface Water Pathway	Not Scored
Soil Exposure Pathway	Not Scored
Air Pathway	Not Scored

HRS SITE SCORE 30.30

WORKSHEET FOR COMPUTING HRS SITE SCORE

		S	S^2
1.	Ground Water Migration Pathway Score (S_{gw}) (from Table 3-1, line 13)	60.60	3672.36
2a.	Surface Water Overland/Flood Migration Component (from Table 4-1, line 30)	Not Scored	
2b.	Ground Water to Surface Water Migration Component (from Table 4-25, line 28)	Not Scored	
2c.	Surface Water Migration Pathway Score (S_{sw}) Enter the larger of lines 2a and 2b as the pathway score.	Not Scored	
3.	Soil Exposure Pathway Score (S_s) (from Table 5-1, line 22)	Not Scored	
4.	Air Migration Pathway Score (S_a) (from Table 6-1, line 12)	Not Scored	
5.	Total of $S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2$	3672.36	
6.	**HRS Site Score** Divide the value on line 5 by 4 and take the square root	30.30	

PREScore 4.1
GROUND WATER MIGRATION PATHWAY SCORESHEET

GROUND WATER MIGRATION PATHWAY Factor Categories & Factors	MAXIMUM VALUE	VALUE ASSIGNED
Liklihood of Release to an Aquifer Aquifer: KIRKWOOD-COHANSEY		
1. Observed Release	550	550
2. Potential to Release		
2a. Containment	10	N/A
2b. Net Precipitation	10	N/A
2c. Depth to Aquifer	5	N/A
2d. Travel Time	35	N/A
2e. Potential to Release [lines 2a (2b+2c+2d)]	500	N/A
3. Liklihood of Release	550	550
Waste Characteristics		
4. Toxicity/Mobility	*	1.00E+01
5. Hazardous Waste Quantity	*	100
6. Waste Characteristics	100	10
Targets		
7. Nearest Well	50	5.00E+01
8. Population		
8a. Level I Concentrations	**	4.53E+02
8b. Level II Concentrations	**	0.00E+00
8c. Potential Contamination	**	4.00E+02
8d. Population (lines 8a+8b+8c)	**	8.53E+02
9. Resources	5	5.00E+00
10. Wellhead Protection Area	20	0.00E+00
11. Targets (lines 7+8d+9+10)	**	9.08E+02
12. Targets (including overlaying aquifers)	**	9.09E+02
13. Aquifer Score	100	60.60
GROUND WATER MIGRATION PATHWAY SCORE (Sgw)	100	60.60

* Maximum value applies to waste characteristics category.
** Maximum value not applicable

REFERENCES

Reference Number	Description of the Reference
1.	U.S. Environmental Protection Agency (USEPA), Revised Hazard Ranking System, Final Rule, 40 CFR 300, Appendix A, December 14, 1990.(see 55 *FR* 51532, December 14, 1990) [10 pp.]
2.	USEPA, Superfund Chemical Data Matrix, SCDM Data Version: JUN96. [3 pp.]
3.	New Jersey Department of Environmental Protection, Division of Publicly Funded Site Remediation, Environmental Measurements and Site Assessment Section, Expanded Site Investigation Report, Iceland Coin Laundry and Dry Cleaning, a.k.a., Garrision Road Well Contamination, a.k.a., Kelley Carpet, November 24, 1997. [540 pp.]
4.	Minsavge, D., Region II Superfund Technical Assessment and Response Team (START), Project Note to Iceland Coin Laundry and Dry Cleaning Area Ground Water Contamination file, Subject: Latitude and Longitude Calculations, June 3, 1999. [4 pp. and 1 topographic map]
5.	Foerter, D., Region II START, Project Note to Iceland Coin Laundry and Dry Cleaning Area Ground Water Contamination file, Subject: Analytical data collected from private wells by the Vineland City Health Department in 1990-1991, June 3, 1999. [90 pp.]
6.	Vowinkel, E.F., USGS, Ground-Water Withdrawals from the Coastal Plain of New Jersey, 1956-80, Open-File Report 84-226, 1984. [7 pp.]
7.	Zapecza, O.S., USGS, Hydrogeologic Framework of the New Jersey Coastal Plain, USGS Professional Paper 1404-B, 1989. [4 pp. and 1 plate]
8.	Martin, M., USGS, Ground-Water Flow in the New Jersey Coastal Plain, Open-File Report 87-528, 1990. [3 pp.]
9.	Zapecza, O.S., L.M. Voronin, and M. Martin, U.S. Geological Survey (USGS), Ground-Water-Withdrawal and Water-Level Data Used to Simulate Regional Flow in the Major Coastal Plain Aquifers of New Jersey, Water-Resources Investigations 87-4038, 1987. [11 pp.]

REFERENCES (continued)

Reference Number	Description of the Reference
10.	Foerter, D., Region II START, Project Note to Iceland Coin Laundry and Dry Cleaning file, Subject: City of Vineland Water-Sewer Utility Interview, April 26, 1999. [1 p.]
11.	State of New Jersey, Department of Labor, Division of Labor Market and Demographic Research, NJSDC 1990 CENSUS Publication, Housing Units and Household Population, New Jersey, Counties and Municipalities: 1990, NJSDC-PH90-2, March 1991. [2 pp.]
12.	Minsavage, D., Region II START, Telecon Note to Iceland Coin Laundry and Dry Cleaning Area Ground Water Contamination file, Discussion with D. Russo (Russo Farms) regarding Ground Water Resource, June 3, 1999. [1 p.]
13.	Lugiano, G., City of Vineland, Department of Health, Letter to Edward McClusick, State of New Jersey, DEP - Bureau of Construction, Re: Garrison Road Project, May 11, 1999. [3 pp.]
14.	Foerter, D., Region II START, Telecon Note to Iceland Coin Laundry Area Ground Water Plume, Discussion with J. Morris (City of Millville Water Department) regarding City of Millville Public Supply Wells, June 28, 1999. [1 p.]
15.	Foerter, D., Region II START, Project Note to Iceland Coin Laundry Area Ground Water Plume file, Subject: Private Well Depths, July 7, 1999. [6 pp.]
16.	Minsavage, D., Region II START, Telecon Note to Iceland Coin Laundry and Dry Cleaning Ground Water Contamination file, Discussion with S. Spayd (New Jersey Geological Survey [NJGS]) regarding Wellhead Protection Areas, June 3, 1999. [1 p.]
17.	Foerter, D., Region II START, Project Note to Iceland Coin Laundry Area Ground Water Plume file, Subject: Private Well Populations, July 9, 1999. [2 pp.]

SOURCE DESCRIPTION

2.2 SOURCE CHARACTERIZATION

Number of the source: 1

Name and description of the source:

Ground water plume with no identified source (Other)

The Iceland Coin Laundry Area Ground Water Plume site consists of a contamination plume defined for HRS purposes by Level I tetrachloroethylene (PCE) concentrations. The plume is defined as containing residential wells identified as contaminated by PCE and meeting the criteria for an observed release (Ref. 5). The plume also includes the area of the former Iceland Coin Laundry and Dry Cleaning facility, as defined by direct push method boring ground water samples meeting the criteria for an observed release during the NJDEP ESI conducted in 1995-1996 (Ref. 3, pp. 239, 241, 245, 247). The plume area encompasses a commercial/residential area of Vineland, Cumberland County New Jersey, including portions of the following streets: South Delsea Drive, Dirk Drive, Garrison Road, Lois Lane, South Orchard Road, West Elmer Road, and West Korff Drive. (Ref. 5, p. 2; Figure 2).

Between September 1987 and October 1990, three ground water samples were collected from a potable well located on 1276 Garrison Road by the Vineland City Health Department. Analytical results from these samples indicated the presence of volatile organic compounds (VOCs) exceeding State and Federal MCLs (Ref. 3, pp. 8, 9). Subsequently, the Vineland City Health Department collected potable well samples from 55 residences located in the area between December 1990 to September 1991. Analytical results from these sampling activities indicated the presence of VOCs, primarily PCE, at levels exceeding State and Federal MCLs in 16 of the 55 residences sampled (Ref. 5).

As a result of the private well contamination, the New Jersey Department of Environmental Protection (NJDEP) installed point of entry treatment (POET) units to the affected residences as a temporary remedial measure until public supply water mains could be extended to the area. Public supply water mains were extended to these areas in 1994 (Ref. 3, p. 9).

In 1995-1996, the NJDEP conducted an expanded site investigation (ESI) at the former Iceland Coin Laundry and Dry Cleaning facility. This investigation included subsurface soil and ground water sampling. The results of soil sampling conducted in November 1995 showed PCE concentrations up to 8 micrograms per kilogram (ug/kg) (Ref. 3, pp. 11, 227, 229, 231). PCE was detected in ground water samples at concentrations up to 489 parts per billion (ppb) (Ref. 3, pp. 22).

Although analytical data suggests that the former Iceland Coin Laundry and Dry Cleaning facility could be contributing to the PCE ground water contamination in the area, PCE was also detected in samples collected from locations not expected to be impacted by the former Iceland facility. In

1991, NJDEP conducted a soil gas survey in the area of the former Iceland facility. PCE was detected in locations upgradient and sidegradient of the former Iceland facility at concentrations ranging from 2.1 ppb to 1,233 ppb (Ref. 3, pp. 102-117). PCE was also detected in upgradient and sidegradient ground water samples collected during the ESI conducted by NJDEP. During this investigation, portable gas chromatograph results of background samples indicated the presence of PCE at concentrations up to 6.471 ppb (Ref. 3, pp. 16-19).

Location of the source, with reference to a map of the site:

The complete lateral and vertical extent of the ground water plume is unknown. The location of the plume is defined for HRS purposes as the portion of the Kirkwood-Cohansey Aquifer System delineated by Level I concentrations of PCE (Ref. 3, pp. 239, 241, 245, 247; 5). Figure 2 presents Level I PCE concentrations detected during the sampling event conducted by the Vineland City Health Department.

Containment

Release to ground water:

An observed release of contaminants (i.e., PCE) to ground water at concentrations significantly above background is documented by chemical analyses of samples collected from private residential wells by the Vineland City Health Department in 1990-1991 (Ref. 5). An observed release to ground water is also documented by chemical analyses of ground water samples collected from direct push method borings by the NJDEP during their ESI of the former Iceland Coin Laundry and Dry Cleaning facility in 1995-1996 (Ref. No. 3, pp. 239, 241, 245, 247). Based on the fact that the source (i.e., the plume) has no liner, the containment factor for the ground water pathway is 10 (Ref. 1, p. 51596).

2.4.1 Hazardous Substances

Hazardous Substance	Evidence	Reference
	City of Vineland Health Dept. Ground Water Results 1990-1991):	
PCE (max. conc. [760 ppb, 1988 West Korff Drive]	1025 Dirk Drive	5, pp. 83, 85
	1041 Dirk Drive	5, p. 39
	1104 Garrison Road	5, pp. 45, 47
	1196 Garrison Road	5, pp. 32, 34
	1217 Garrison Road	5, pp. 15, 18
	1255 Garrison Road	5, pp. 7, 10
	1276 Garrison Road	5, pp. 3, 6
	1331 Garrison Road	5, pp. 69, 70
	1394 Garrison Road	5, pp. 41, 43
	2163 South Orchard Road	5, pp. 80, 81
	1988 West Korff Drive	5, pp. 76, 78
	2007 West Korff Drive	5, pp. 49, 51
	2023 West Korff Drive	5, pp. 61, 63
	2052 West Korff Drive	5, p. 72
	2057 West Korff Drive	5, pp. 57, 59
	2092 West Korff Drive	5, pp. 53, 55

Hazardous Substance	Evidence	Reference
	NJDEP Expanded Site Investigation* Ground Water Results 1995-1996):	
PCE [max.conc. 140 ppb, GW-7]	GW-3	3, p. 239
	GW-4	3, p. 241
	GW-6	3, p. 245
	GW-7	3, p. 247

* - Reference 3, p. 38 (Map 3B)indicates ground water sample locations.

2.4.2 Hazardous Waste Quantity

2.4.2.1.1 Hazardous Constituent Quantity

The information available is not sufficient to evaluate Tier A source hazardous waste quantity; therefore, hazardous constituent quantity is not scored (NS).

Hazardous Constituent Quantity Value (S): NS

2.4.2.1.2 Hazardous Wastestream Quantity

The information available is not sufficient to evaluated Tier B source hazardous waste quantity.

Hazardous Wastestream Quantity Value (W): NS

2.4.2.1.3 Volume

Based on analytical results of private well samples collected by the Vineland Health Department in 1990-1991, and ground water samples collected from direct push method borings during the ESI conducted by NJDEP in 1995-1996, it is apparent that some amount of contamination is present; however, the exact volume is unknown. A source volume of >0 will therefore be assigned.

Dimension of source (yd^3): >0

Volume Assigned Value: >0

Reference(s): 1, p. 51591; 3, pp. 239, 241, 245, 247; 5

2.4.2.1.4 Area

Area measurement (Tier D) cannot be evaluated, since Hazardous Waste Quantity Table 2-5 does not provide a divisor for the source type "other" in this tier.

Area of source (ft^2): 0

Area Assigned Value: 0

Reference(s): 1, p. 51591

2.4.2.1.5 Source Hazardous Waste Quantity Value

The contaminated ground water plume in the vicinity of the former Iceland Coin Laundry and Dry Cleaning facility is considered to be the source. To date, the exact source has not been pinpointed. Analytical results of ground water samples collected by the Vineland City Health Department in 1990-1991, and by the NJDEP in 1995-1996, indicate that some amount of contamination is present; however, the exact volume is unknown. Therefore, a source waste quantity of >0 is assigned.

(Ref. 1, p. 51591; 3, p. 239, 241, 245, 247; 5).

SITE SUMMARY OF SOURCE DESCRIPTIONS

Source Number	Source Hazardous Waste Quantity Value	Containment			
		Ground Water	Surface Water	Air Gas	Air Particulate
1	>0	10	NS	NS	NS

3.0 GROUND WATER MIGRATION PATHWAY

3.0.1 General Considerations

The aquifer of concern is the Kirkwood-Cohansey Aquifer System (KCAS). Almost 100% of the ground water pumped in Cumberland County comes from the KCAS, the primary water-supply source in the county (Ref. 6, pp. 6, 7). Ground water withdrawn in Cumberland and surrounding counties is used for public and domestic supply, as well as industrial and agricultural uses (Ref. 6, pp. 2, 3, 4).

The KCAS consists of the Kirkwood Formation (upper portion) and the Cohansey Sand. The aquifer system also includes the overlying Bridgeton Formation, which is present locally in portions of Cumberland and the surrounding counties (Ref. 3, p. 88; 7, pp. 2, 3, 4). The thickness of the KCAS in Vineland is approximately 250 feet (Ref. 7, plate 24). In Cumberland County, ground water occurs in the aquifer under water-table conditions (Ref. 6, p. 7; 7, p. 3). Ground water is encountered at depths of approximately 8 to 40 feet below ground surface in the site vicinity (Ref. 3, p. 88). The general direction of ground water flow in the upper Kirkwood-Cohansey Aquifer System is to the southwest (Ref. 3, p. 88). A hydraulic conductivity value of 170 feet per day, or 6 x 10^{-2} centimeters per second (cm/s), has been calculated for the upper KCAS in Vineland (Ref. 8, p. 2).

The KCAS is underlain by regionally extensive clay beds in the basal part of the Kirkwood Formation, which separate the KCAS from the underlying Piney Point aquifer (Ref. 7, pp. 3, 4; 9, pp. 2, 3, 4). There is little or no use of the Piney Point and underlying aquifers for water supply in Cumberland County (Ref. 6, p. 6; 9, pp. 5 through 11).

Stratum 1 (shallowest)

Stratum Name: Bridgeton Formation

Description: The Bridgeton Formation is the uppermost formation of the Kirkwood-Cohansey Aquifer System. It consists of light-colored, heterogeneous sand, and is clayey and pebbly (Ref. 7, p. 3). The formation is widespread in parts of Cumberland County, adding 30 to 50 feet of thickness to the KCAS in those areas (Ref. 7, p. 4).

Stratum 2

Stratum Name: Cohansey Sand

Description: The Cohansey Sand consists of medium- to coarse-grained, light-colored, pebbly sand with local clay beds (Ref. 7, pp. 3, 4). In the site vicinity, it is coarser-grained but in hydraulic connection with the underlying Kirkwood Formation (Ref. 6, p. 5; 7, p. 4).

Stratum 3

Stratum Name: Kirkwood Formation

Description: The Kirkwood Formation consists of fine- to medium-grained, micaceous, gray and tan sand and dark-colored diatomaceous clay (Ref. 7, p. 3). In the site vicinity, fine- to medium-grained sand and silty sand predominate except in the basal part of the formation, where regionally extensive clay beds occur and confine the underlying Piney Point aquifer (Ref. 7, pp. 3, 4).

Stratum 4

Stratum Name: Piney Point Formation

Description: The Piney Point Formation consists of fine- to coarse-grained, glauconitic sand and shell beds (Ref. 7, pp. 3, 4). This aquifer yields moderate quantities of water locally, but is barely used for water supply in Cumberland County (Ref. 6, p. 6; 9, pp. 5 through 11). Therefore, it is not evaluated as an aquifer of concern. The Piney Point Formation is underlain by poorly permeable sediments (Ref. 7, p. 3).

3.1 LIKELIHOOD OF RELEASE

3.1.1 Observed Release

Aquifer Being Evaluated: Kirkwood-Cohansey Aquifer System

A review of analytical data from ground water samples collected from private wells by the Vineland City Health Department in 1990-1991, and from ground water samples collected from direct push method borings by the NJDEP in 1995-1996, indicates that there is an observed release of PCE to the aquifer of concern. (i.e., Kirkwood-Cohansey Aquifer System).

Chemical Analysis

An observed release of PCE to ground water is documented by the chemical analyses of ground water samples collected from 16 private potable wells by the Vineland City Health Department in 1990-1991 (Ref. 5). PCE was detected in contaminated samples at concentrations significantly greater than in background samples. Concentrations detected in contaminated samples exceeded the cancer-risk benchmark concentration of 1.6 ppb (Ref. 2, p. B-39). Private wells are screened in the Kirkwood-Cohansey Aquifer System (Ref. 6, pp. 6, 7; 7, p. 3; 10). Point of entry teatment units were installed in the affected residences as a temporary remedial measure until public supply water mains could be extended by the Vineland City Water Department (Ref. 3, p. 9)

An observed release of PCE to ground water is also documented by the chemical analyses of ground water samples collected from direct push method borings during the NJDEP ESI conducted at the former Iceland Coin Laundry and Dry Cleaning facility in 1995-1996. PCE was detected in contaminated samples at concentrations significantly greater (i.e., up to 140 ppb) than in background samples, which were not detected at a detection level of 10 ppb (Ref. 3, pp. 235, 239, 241, 245, 247). The concentration detected in the contaminated samples exceed the cancer-risk benchmark concentration of 1.6 ppb (Ref. 2, p. B-39). Selected background samples were collected from boring locations which were expected to be outside the influence of contamination from the site (i.e., upgradient or side-gradient of the former Iceland facility) (Ref. 3, pp. 14, 38). All background boring locations, as well as the contaminated sample boring locations, are screened in the Kirkwood-Cohansey Aquifer System (Ref. 6, pp. 6, 7; 10). All samples were analyzed for Target Compound List (TCL) Volatile Organic Compounds (VOCs), Semivolatile, Pesticide/PCBs and Target Analyte List (TAL) inorganics in accordance with the Organic Contract Laboratory Program Statement of Work OLM01.8 and Inorganic Statement of Work ILM03.0. Analytical data were evaluated in accordance with U.S. EPA Region II Contract Laboratory Program (CLP) protocol (Ref. 3, p. 283).

Background Concentrations (Private Potable Wells)

Sample ID (Well Location)*	Depth	Date	References
Toboloski (1133 Garrison Road)	unk.	12/28/90	5, pp. 23, 26
Doane (1293 Garrison Road)	unk.	1/31/91	5, pp. 35, 36
McDade (993 Garrison Road)	unk.	4/19/91	5, pp. 65, 67
Sprague (1101 Garrison Road)	unk.	6/20/91	5, pp. 82, 82A
Majewski (950 Garrison Road)	unk.	7/9/91	5, pp. 87, 88

* Background samples were collected from private wells located in the area of the plume where PCE was not detected. All background samples are screened in the Kirkwood-Cohansey Aquifer System (Ref. 6, pp. 6, 7; 10).

unk. Depth unknown.

Sample ID	Hazardous Substance	Conc. (ppb)	Detection Limit (ppb)	References
Toboloski	PCE	ND	0.50	5, pp. 23, 26
Doane	PCE	ND	1.0	5, pp. 35,36
McDade	PCE	ND	0.50	5, pp. 65,67
Sprague	PCE	ND	1.0	5, pp.82,82A
Majewski	PCE	ND	0.50	5, pp. 87,88

ND - Not Detected

Contaminated Samples (Private Potable Wells)

Sample ID (Well Location)	Depth+	Date	References
Bush (1025 Dirk Drive)	unk.	7/9/91	5, pp. 83, 85
Janasiak (1041 Dirk Drive)	55	4/19/91	5, p. 39
Daly (1104 Garrison Road)	unk.	4/19/91	5, pp. 45, 47
Dziuba (1196 Garrison Road)	75	1/31/91	5, pp. 32, 34
Robinson (1217 Garrison Road)	120	12/28/90	5, pp. 15, 18
Dixon (1255 Garrison Road)	65-70	12/28/90	5, pp. 7, 10
Mikytuck (1276 Garrison Road)	100	8/3/90	5, pp. 3, 6
DeCinque (1331 Garrison Road)	80	4/25/91	5, pp. 69, 70
Hopkins (1394 Garrison Road)	unk.	4/19/91	5, pp. 41, 43
Schiapelli (2163 S. Orchard Rd.)	90	6/20/91	5, pp. 80, 81
Wickham (1988 West Korff Drive)	60	6/6/91	5, pp. 76, 78
Sammartino (2007 West Korff Dr.)	43	4/19/91	5, pp. 49, 51
Coughlin (2023 West Korff Drive)	unk.	4/19/91	5, pp. 61, 63
Loatman (2052 West Korff Drive)	unk.	5/17/91	5, p. 72
Zukovsky (2057 West Korff Drive)	unk.	4/19/91	5, pp. 57, 59
Morales (2092 West Korff Drive)	unk.	4/19/91	5, pp. 53, 55

+ Depth refers to the total depth of the well sampled in feet below ground surface. All contaminated wells are screened in the Kirkwood-Cohansey Aquifer System (Ref. 6, pp. 6, 7; 10). See Reference 15 for well depth documentation

Sample ID	Hazardous Substance	Conc. (ppb)	Detection Limit (ppb)	Reference
Bush	PCE	2.1	0.50	5, pp. 83, 85
Janasiak	PCE	44.91	0.50	5, p. 39
Daly	PCE	3.46	0.50	5, pp. 45, 47
Dziuba	PCE	2.6	1.0	5, pp. 32, 34
Robinson	PCE	30	0.50	5, pp. 15, 18
Dixon	PCE	80	0.50	5, pp. 7, 10
Mikytuck	PCE	37	0.50	5, pp. 3, 6
DeCinque	PCE	41	1.0	5, pp. 69, 70
Hopkins	PCE	3.53	0.50	5, pp. 41, 43
Schiapelli	PCE	7.6	1.0	5, pp. 80, 81
Wickham	PCE	760	25.0	5, pp. 76, 78
Sammartino	PCE	352.04	0.50	5, pp. 49, 51
Coughlin	PCE	1.71	0.50	5, pp. 61, 63
Loatman	PCE	3.55	0.50	5, p. 72
Zukovsky	PCE	12.13	0.50	5, pp. 57, 59
Morales	PCE	2.29	0.50	5, pp. 53, 55

Background Concentrations (Direct Push Method samples)

Sample ID	Well Location*	Depth+	Date	References
GW-1	Direct Push Boring GW-1	19	11/16/95	3, pp. 38, 235

* Background samples were collected from direct push method borings believed to be upgradient/sidegradient of the former Iceland Coin Laundry and Dry Cleaners property and outside the influence of contamination from the site. All background samples were screened in the Kirkwood-Cohansey Aquifer System (Ref. 6, pp. 6, 7; 7, p. Plate 24).

+ Depth refers to the depth of well screen in feet below ground surface (Ref. 3, p. 14).

Background Concentrations (Direct Push Method Samples) - (continued)

Sample ID	Hazardous Substance	Conc. (ppb)	CRQL (ppb)	References
GW-1	PCE	ND	10	3, pp. 38, 235

ND - Not Detected
CRQL - Contract Required Quantitation Limit (Ref. 3, p. 284)

Contaminated Samples (Direct Push Method Samples)

Sample ID	Well Location*	Depth+	Date	References
GW-3	Direct Push Boring GW-3	19	11/16/95	3, pp. 14, 38, 239
GW-4	Direct Push Boring GW-4	19	11/16/95	3, pp. 14, 38, 241
GW-6	Direct Push Boring GW-6	19	11/16/95	3, pp. 14, 38, 245
GW-7	Direct Push Boring GW-7	19	11/16/95	3, pp. 14, 38, 247

* Direct Push Method Boring locations were located downgradient of the cleaners facility (Ref. 3, pp. 14, 38).
\+ Depth refers to the depth where the sample was collected in feet below ground surface (Ref. 3, p. 14).

Sample ID	Hazardous Substance	Conc. (ppb)	CRQL (ppb)	Reference
GW-3	PCE	130	10	3, p. 239
GW-4	PCE	40	10	3, p. 241
GW-6	PCE	19	10	3, p. 245
GW-7	PCE	140	10	3, p. 247

CRQL - Contract Required Quanititation Limit (Ref. 3, p. 284)

Contaminated Samples (continued)

Level I Samples

Sample ID: All of the private well samples listed above

Reference for Benchmarks: 2, p. B-39

Hazardous Substance	Cancer-risk Benchmark Concentration
PCE	1.6E-03 (1.6 ppb)

Attribution:

Although analytical data suggests that the former Iceland Coin Laundry and Dry Cleaning facility could be contributing to the PCE ground water contamination in the area, PCE was also detected in samples collected from locations not expected to be impacted by the former Iceland facility. In 1991, NJDEP conducted a soil gas survey in the area of the former Iceland facility. PCE was detected in locations upgradient and sidegradient of the former Iceland facility at concentrations ranging from 2.1 ppb to 1,233 ppb (Ref. 3, pp. 102-117). PCE was also detected in upgradient and sidegradient ground water samples collected during the NJDEP ESI. During this investigation, portable gas chromatograph results of background samples indicated the presence of PCE at concentrations up to 6.471 ppb (Ref. 3, pp. 16-19).

Contaminated Samples (continued)

Hazardous Substances Released:

PCE

Based on analytical results from ground water samples collected from private wells by the Vineland City Health Department in 1990-1991, an observed release (by chemical analysis) to ground water is documented; therefore, a ground water observed release factor value of 550 is assigned (Ref. 1, p. 51595).

==========

Ground Water Observed Release Factor Value: 550

3.2 WASTE CHARACTERISTICS

3.2.1 Toxicity/Mobility

Hazardous Substance	Source No.	Toxicity Factor Value	Mobility Factor Value*	Toxicity/ Mobility	Reference
PCE	1	100	1	100	1,p. 51601; 2, p. B-18

* - An observed release to ground water is established; therefore, a mobility factor of 1 is assigned.

==========

Toxicity/Mobility Factor Value: 100

3.2.2 Hazardous Waste Quantity

Source Number	Source Hazardous Waste Quantity Value (Section 2.4.2.1.5)	Is source hazardous constituent quantity data complete? (yes/no)
1	>0	No
Sum of Values:	>0	

The hazardous waste quantity value is >0. Based on the fact that targets are subject to Level I concentrations of PCE, a hazardous waste quantity factor value of 100 can be assigned if it is greater than the hazardous waste quantity value. Therefore, a hazardous waste quantity factor value of 100 is assigned for the ground water pathway (Ref. 1, pp. 51591, 51592).

3.2.3 Waste Characteristics Factor Category Value

Toxicity/Mobility Factor Value (100) x Hazardous Waste Quantity Factor Value (100): 1×10^4

The product 1×10^4 corresponds to a waste characteristics factor category value of 10 in Table 2-7 of the HRS rule (Ref. 1, pp. 51592).

==========

Hazardous Waste Quantity Factor Value: 100
Waste Characteristics Factor Category Value: 10

3.3 TARGETS

The wells listed below consists of private and public supply wells which are located within 4 miles of the site and draw from the aquifer of concern (i.e., the Kirkwood-Cohansey Aquifer System). Please refer to Figure 3 for the locations of these public supply wells.

Well	Distance from Source*	Level I Contam. (Y/N)	Level II Contam. (Y/N)	Potential Contam. (Y/N)	Reference**
1025 Dirk Drive	0.00 mile	Y	N	N	5, p. 85
1041 Dirk Drive	0.00 mile	Y	N	N	5, p. 39
1104 Garrison Road	0.00 mile	Y	N	N	5, p. 47
1196 Garrison Road	0.00 mile	Y	N	N	5, p. 34
1217 Garrison Road	0.00 mile	Y	N	N	5, p. 18
1255 Garrison Road	0.00 mile	Y	N	N	5, p. 10
1276 Garrison Road	0.00 mile	Y	N	N	5, p. 6
1331 Garrison Road	0.00 mile	Y	N	N	5, p. 70
1394 Garrison Road	0.00 mile	Y	N	N	5, p. 43
2163 S. Orchard Rd.	0.00 mile	Y	N	N	5, p. 81
1988 West Korff Dr.	0.00 mile	Y	N	N	5, p. 78
2007 West Korff Dr.	0.00 mile	Y	N	N	5, p. 51
2023 West Korff Dr.	0.00 mile	Y	N	N	5, p. 63
2052 West Korff Dr.	0.00 mile	Y	N	N	5, p. 72
2057 West Korff Dr.	0.00 mile	Y	N	N	5, p. 59
2092 West Korff Dr.	0.00 mile	Y	N	N	5, p. 55
Vineland Well #9	0.85 mile	N	N	Y	10; Fig. 3
Vineland Well #5	1.60 mile	N	N	Y	10; Fig. 3
Vineland Well #12	1.70 mile	N	N	Y	10; Fig. 3
Vineland Well #13	2.10 mile	N	N	Y	10; Fig. 3
Vineland Well #4	2.25 mile	N	N	Y	10; Fig. 3
Vineland Well #1	2.40 mile	N	N	Y	10; Fig. 3
Vineland Well #2	2.40 mile	N	N	Y	10; Fig. 3
Vineland Well #3	2.40 mile	N	N	Y	10; Fig. 3
Vineland Well #7	2.60 mile	N	N	Y	10; Fig. 3
Vineland Well #8	2.70 mile	N	N	Y	10; Fig. 3
Vineland Well #6	3.60 mile	N	N	Y	10; Fig. 3
Millville Well #17	3.70 mile	N	N	Y	14; Fig. 3

* The source is the contamination plume defined by Level I PCE concentrations detected in private wells (i.e., wells where PCE was detected above the cancer-risk benchmark concentration of 1.6 ppb). Since these wells are included in the source, the distance of these wells from the source is 0.00 mile.

** Well location of private wells are plotted and presented in Figure 2. Well Locations for public supply wells are plotted in Figure 3.

Note: All of the above-mentioned wells are screened in the Kirkwood-Cohansey Aquifer System (i.e., aquifer of concern) (Ref. 6, pp. 6, 7; 10).

3.3.1 Nearest Well

Well: 2052 West Korff Road

The well located at 2052 West Korff Road is evaluated as the nearest well. This well has been determined to have Level I concentrations of PCE and is located near the center of the estimated plume area (see Figure 2); therefore, a nearest well value of 50 is assigned.

Level of Contamination (I, II, or potential): Level I

(Ref. 1, p. 51603; 4; 5, p. 72; Figure 2)

==========

Nearest Well Factor Value: 50

3.3.2 Population

3.3.2.2 Level I Concentrations

Level I Well	Population	Reference
1025 Dirk Drive (Bush)	3	5, pp. 83, 85
1041 Dirk Drive (Janasiak)	2.79	5, p. 39
1104 Garrison Road (Daly)	2	5, pp. 45, 47
1196 Garrison Road (Dziuba)	3	5, pp. 32, 34
1217 Garrison Road (Robinson)	4	5, pp. 15, 18
1255 Garrison Road Dixon)	2.79	5, pp. 7, 10
1276 Garrison Road (Mikytuck)	2.79	5, pp. 3, 6
1331 Garrison Road (DeCinque)	1	5, pp. 69, 70
1394 Garrison Road (Hopkins)	2.79	5, pp. 41, 43
2163 South Orchard Road (Schiapelli)	2.79	5, pp. 80, 81
1988 West Korff Drive (Wickham)	2.79	5, pp. 76, 78
2007 West Korff Drive (Sammartino)	2	5, pp. 49, 51
2023 West Korff Drive (Coughlin)	5	5, pp. 61, 63
2052 West Korff Drive (Loatman)	2.79	5, p. 72
2057 West Korff Drive (Zukovsky)	3	5, pp. 57, 59
2092 West Korff Drive (Morales)	2.79	5, pp. 53, 55
Total population served	45.32	

Private well populations were obtained by contacting residents to obtain the number of people utilizing the well at the time of closure (Ref. 17). In cases where private well populations for homes could not be obtained, 1990 U.S. Census data (i.e., average persons per household in Cumberland County) (Ref. 11). Based on the above information, the Level I concentration factor value is 453.2. This value is obtained by multiplying the total population served by wells subject to Level I concentrations by 10 (453.2 x 10 = 453.2) (Ref. 1, p. 51603).

==========

Population Served by
Level I Wells: 45.32 Level I Concentrations Factor Value: 453.2

3.3.2.3 Level II Concentrations

Level II Well	Population	Reference
Not Applicable (N/A)	N/A	N/A

==========

Population Served by
Level II Wells: 0

Level II Concentrations Factor Value: N/A

3.3.2.4 Potential Contamination

The City of Vineland currently operates 13 public supply wells which serve approximately 34,000 people; 11 of these wells are located within 4 miles of the Iceland Coin Laundry Area Ground Water Plume site (Ref. 10, p. 1; Figure 3). Public supply wells listed below are located within the site's 4-mile vicinity and draw from the aquifer of concern (i.e., the Kirkwood-Cohansey Aquifer System). These public supply wells are interconnected and none of the wells pump over 40 percent of its system's capacity. Vineland does not sell or distribute water to other communities (Ref. 10, pp. 1). Based on this information, each well is estimated to serve approximately 2,615.38 people.

The City of Millville operates one well within the site's 4-mile vicinity. This well is part of a system of nine interconnected wells serving an approximate population of 28,000 people. These wells pump equally and are screened in the Kirkwood-Cohansey Aquifer System. Based on this information, each well serves approximately 3,111.11 people. The City of Millville does not sell water to other communities (Ref. 14).

Distance Category	Total Wells Evaluated		Potential Population	Distance-Weighted Population Value
0 to ¼ mile	1 private		2.79	4
>¼ to ½ mile	None		0	0
>½ to 1 mile	1 Vineland	2,615.38	523	
>1 to 2 miles	2 Vineland	5,230.76	939	
>2 to 3 miles	7 Vineland	18,307.66	2,122	
>3 to 4 miles	1 Vineland; 1 Millville		5,726.49	417

Sum of Distance-Weighted Population Values: 4,005

* One home (not impacted by Level I concentrations of PCE) is located within the area of the contaminated ground water plume (i.e., 0 to ¼ mile distance ring). This home is not connected to public supply and is currently obtaining their potable water from their private well (Ref. 13). An estimated population of 2.79 people is evaluated within this distance ring. This population was obtained from 1990 U.S. Census data (i.e., average persons per household in Cumberland County) (Ref. 11).

Ref. 1, p. 51604; 11; 13; Figure 3

==========

Potential Contamination Factor Value: 400.5

3.3.3 Resources

Ground Water is used as a resource within 4 miles of the site. There is a well approximately 1.1 mile from the contaminated ground water plume which is used to irrigate approximately 60 acres of commercial food crops (i.e., green onions). Therefore, a resources value of 5 is assigned (Ref. 1, p. 51604; 3, p. 49; 12)

==========

Resources Factor Value: 5

3.3.4 Wellhead Protection Area

To date, Final Wellhead Protections Areas have not been delineated in New Jersey; therefore, a Wellhead Protection Area Factor Value of 0 is assigned (Ref. 16).

==========

Wellhead Protection Area Factor Value: 0

EPA United States Environmental Protection Agency

...to protect human health and to safeguard the natural environment...

DOCUMENT SUBMISSION

Please complete the following information to ensure the attached document can be processed properly.

Docket Office	SFUND
Docket ID	SFUND-1999-0005
Document Title	HAZARD RANKING SYSTEM FOR NPL-U29
Document ID (Backfile scanning only)	LIGHTMAN DRUM COMPANY

Please tell us whom to contact should there be questions concerning the attached document.

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MAY 14, 1999 64 PAGES

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NPL-U29-2-2-R:

HRS DOCUMENTATION RECORD--REVIEW COVER SHEET

Name of Site: Lightman Drum Company

Contact Persons

Site Investigation:	Foster Wheeler	201-597-7000
	Kathy Moyik	212-637-4339
Documentation Record:	Ben Conetta	212-637-4435
	Alan Greenlaw	201-529-4700

Pathways, Components, or Threats Not Scored

The surface water pathway was not scored since insufficient data exist. No surface water or sediment samples were collected in either the Phase I or the Phase II Remedial Investigations. The nearest surface water is the Pump Creek, which borders the western property line of the site. The Pump Creek is located approximately 1,000 feet from known areas of activity on the site.

The soil exposure pathway was not scored as preliminary calculations indicated that it would have an insignificant impact on the overall site score. Although contamination of site surface soil is documented, there are no residences, schools, or day care centers on or within 200 feet of the areas of contamination.

The air pathway was not scored as preliminary calculations indicated that it would have an insignificant impact on the overall site score.

LIGHTMAN DRUM COMPANY
Winslow Township, New Jersey

The Lightman Drum Company site is located in Winslow Township, Camden County, New Jersey, along Route 73. Lightman Drum acquired the property in April 1974 and began recycling drums. Lightman Drum received drums on site, some of which were full or partially full; the drums would be emptied before they could be forwarded to an off-site location for cleaning. Initially, Lightman dug a pit at the rear of the property to discard the contents of any drum that arrived "heavy." This practice was discovered by an adjacent property owner, who contacted the New Jersey Department of Environmental Protection (NJDEP). A formal complaint was filed and Lightman was taken to court and ordered to line the pit or stop the practice.

The NJDEP continued to monitor operations at the site and in 1977, during a site inspection, discovered that Lightman had installed two 5,000-gallon underground storage tanks. Lightman applied for, and was granted, a Temporary Operating Authority (TOA) permit to receive and store specific special waste types prior to final disposition at an approved hazardous waste disposal facility. The facility was allowed to accept chemical powders, pesticides, waste oils, emulsions, oil sludges, paint, pigment, ink residues, ketones, alcohols, mixed solvents, acids and alkalis. The TOA was in effect for a period of one year, pending the approval of an engineering design for the facility that would be compliant with the requirements of the Solid Waste Administration. Under the TOA, Lightman consolidated chemical residues in the underground storage tanks, in drums, and in trailers. Numerous violations occurred during this period of operation, which lead to the subsequent denial of Lightman's application to continue as a hazardous waste storage facility.

In an NJDEP 1987 sampling event and the resulting April 12, 1988 AO, the following contaminants were indicated as being present in site soils; 1,2,4-trichlorobenzene, tetrachlorethene, 1,4-dichlorobenzene, 1,2- dichlorobenzene, 1,3-dichlorobenzene, bis(2-ethylhexyl)phthalate, butyl benzyl phthalate, di-n octyl phthalate, aroclor-1254, chromium, cadmium and lead.

Lightman was ordered to conduct a Remedial Investigation (RI) to determine the impact of the pollution on human health and the environment. Data collected during the investigation documented that a release of hazardous substances from the site to ground water had occurred as a result of operations of the Lightman Drum Company. Within four miles of the site, seven public supply wells and numerous private wells utilize the Kirkwood-Cohansey Aquifer (the contaminated aquifer) as a source of drinking water. Over 20,000 people using the aquifer for drinking water are potentially affected by the site.

[The description of the site (release) is based on information available at the time the site was scored. The description may change as additional information is gathered on the sources and extent of contamination. See 56 FR 5600, February 11, 1991, or subsequent FR notices.]

HRS DOCUMENTATION RECORD

Name of Site: Lightman Drum Company

EPA Region: II

Date Prepared: May 14, 1999

Street Address of Site: Route 73

County and State: Camden, New Jersey

CERCLIS ID No.: NJD014743678 (Ref. No. 3)

General Location in the State: Winslow Township, Cedarbrook, New Jersey

Topographic Map: Williamstown

Latitude: 39° 43' 47.0"

Longitude: 74° 54' 21.3"

Ref. No. 30

Scores

Air Pathway	Not scored
Ground Water Pathway	84.05
Soil Exposure Pathway	Not scored
Surface Water Pathway	Not scored
HRS SITE SCORE	42.03

WORKSHEET FOR COMPUTING HRS SITE SCORE

		S	S^2
1.	Ground Water Migration Pathway Score (S_{gw}) (from Table 3-1, line 13)	84.05	7064.40
2a.	Surface Water Overland/Flood Migration Component (from Table 4-1, line 30)	NS	NS
2b.	Ground Water to Surface Water Migration Component (from Table 4-25, line 28)	NS	NS
2c.	Surface Water Migration Pathway Score (S_{sw}) Enter the larger of lines 2a and 2b as the pathway score.	NS	NS
3.	Soil Exposure Pathway Score (S_s) (from Table 5-1, line 22)	NS	NS
4.	Air Migration Pathway Score (S_a) (from Table 6-1, line 12)	NS	NS
5.	Total of $S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2$		7060.40
6.	**HRS Site Score** Divide the value on line 5 by 4 and take the square root	42.03	

NS - Not Scored

HRS DOCUMENTATION RECORD

1. Site Name: LIGHTMAN DRUM COMPANY
   (as entered in CERCLIS)

2. Site CERCLIS Number: NJD014743678

3. Site Reviewer: ALAN GREENLAW

4. Date: 4/6/99

5. Site Location: CEDARBROOK, WINSLOW TWP.,CAMDEN, NEW JERSEY
   (City/County, State)

6. Congressional District: 01

7. Site Coordinates: Single

   Latitude: 39°43'47.0" Longitude: 74°54'21.3"

	Score
Ground Water Migration Pathway Score (Sgw)	84.05
Surface Water Migration Pathway Score (Ssw)	0.00
Soil Exposure Pathway Score (Ss)	0.00
Air Migration Pathway Score (Sa)	0.00

Site Score	42.03

GROUND WATER MIGRATION PATHWAY SCORESHEET

GROUND WATER MIGRATION PATHWAY Factor Categories & Factors	Maximum Value	Value Assigned
Likelihood of Release to an Aquifer Aquifer: KIRKWOOD-COHANSEY		
1. Observed Release	550	550
2. Potential to Release		
2a. Containment	10	10
2b. Net Precipitation	10	0
2c. Depth to Aquifer	5	5
2d. Travel Time	35	35
2e. Potential to Release [lines 2a(2b+2c+2d)]	500	400
3. Likelihood of Release	550	550
Waste Characteristics		
4. Toxicity/Mobility	*	2.00E+02
5. Hazardous Waste Quantity	*	10000
6. Waste Characteristics	100	32
Targets		
7. Nearest Well	50	2.00E+01
8. Population		
8a. Level I Concentrations	**	0.00E+00
8b. Level II Concentrations	**	0.00E+00
8c. Potential Contamination	**	3.74E+02
8d. Population (lines 8a+8b+8c)	**	3.74E+02
9. Resources	5	0.00E+00
10. Wellhead Protection Area	20	0.00E+00
11. Targets (lines 7+8d+9+10)	**	3.94E+02
12. Targets (including overlaying aquifers)	**	3.94E+02
13. Aquifer Score	100	84.05
GROUND WATER MIGRATION PATHWAY SCORE (Sgw)	100	84.05

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.

REFERENCES

Reference Number	Description of the Reference
1.	Hazard Ranking System; Final Rule, 40 Code of Federal Regulations Part 300, Federal Register, Volume 55, No. 241, December 14, 1990. (1 page)
2.	Superfund Chemical Data Matrix (SCDM), June 1996 (13 pages, non-consecutive)
3.	United States Environmental Protection Agency (USEPA) Superfund Program, Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS), List 8: Site/Action Listing, p. 213, January 11, 1999. (1 page)
4.	Phase II Remedial Investigation (RI), Lightman Drum Co., Winslow Township, NJ, prepared by International Exploration, Inc. (INTEX), October 1990. (53 pages, consecutive).
5.	Memorandum from Linda M. Appel, New Jersey Department of Environmental Protection (NJDEP) Hazardous Site Mitigation Specialist II, Quality Assurance Section, Bureau of Environmental Measurements and Quality Assurance, to Steve Byrnes, NJDEP Technical Coordinator, Bureau of Environmental Evaluation and Risk Assessment, Subject: Analytical Data Validation of Sampling Conducted at Berlin, Camden County, NJ, Analysis Performed by ETC According to ACO Requirements, Tier I CLP Deliverable Requirements, February 1, 1991. (11 pages, consecutive)
6.	RI, Lightman Drum Company, Berlin, NJ, prepared by INTEX, September 1989. (81 pages, non-consecutive)
7.	NJDEP Permit, Lightman Drum Company, November 2, 1978. (1 page)
8.	Correspondence between David J. Shotwell, NJDEP, Bureau Chief, Bureau of Field Operations, to Jerome Lightman, Subject: Administrative Order, April 12, 1988. (8 pages, consecutive)
9.	Memorandum from J. Hartman, NJDEP, to File, Subject: Site Investigation Report of the Lightman Drum Company, May 18-19, 1977. (4 pages, consecutive)
10.	NJDEP, Division of Waste Management Site Inspection Report, November 20, 1984. (7 pages, consecutive)
11.	Memorandum from Terry Ostrander, NJDEP, to Tom Downey, NJDEP, Subject: Lightman Drum Company, Inc., Cedarbrook, Winslow Twp., Camden County, October 21, 1984. (19 pages, consecutive)
12.	Mailgram from Beatrice S. Tylutki, Director, to Lightman Drum Company, Subject: Expiration of Temporary Operating Authority, April 30, 1979. (1 page)

REFERENCES

Reference Number	Description of the Reference
13.	Letter from Beatrice S. Tylutki, NJDEP, Director, Solid Waste Administration, to Nathan R. Frenkel, Executive Vice President, Environmental Consulting and Testing Services, Subject: Lightman Drum - Facility No. 6436A, June 28, 1979. (1 page)
14.	Manifest #108393, May 29, 1979. (1 page)
15.	Manifest #0182908 Summary, August 18, 1983. (2 pages, consecutive)
16.	Investigation Report, The Office of the Camden County Fire Marshal Fire Investigation Unit, prepared by Anthony R. Braig, Investigation #84-7-183-I, July 26, 1984. (11 pages, consecutive)
17.	Memorandum from William Krimson, NJDEP, to Charles Krauss, NJDEP, Subject: Lightman Drum, Inc. - Fire, July 27, 1984. (2 pages, consecutive)
18.	Lightman Drum Company Well Logs and Monitoring Well Certifications, 1990. (12 pages, non-consecutive)
19.	Letter from Steven McNulty, Project Engineer, Malcolm Pirnie, Inc., to Diane Leckie, NJDEP, Water Supply Element, Bureau of Water Allocation, Subject: Manual Well Search - Two (2) Mile Radius, Lightman Drum Company Site, November 11, 1998. (217 pages, non-consecutive)
20.	Hydrogeologic Framework of the New Jersey Coastal Plain, Regional Aquifer System Analysis, U.S. Geological Survey (U.S.G.S.) Open File Report 84-730. (7 pages, non-consecutive)
21.	Site inspection sketch by Krimson/Ostrunder, NJDEP inspectors of the Lightman Drum Co., Inc., August 9, 1984. (1 page)
22.	Groundwater Flow Directions and Hydraulic Gradient Determinations Map from Phase II Remedial Investigation, Lightman Drum Company, Winslow Twp., NJ, Prepared for Lightman Drum Company by INTEX, October 1990. (1 page)
23.	Correspondence from Catherine K. Fiolkowski, Subject: Lightman Drum Co., Route 73, Cedar Brook, unknown date. (3 pages, consecutive)
24.	Site investigation: Ed Cotterell, NJDEP, Spills General File Report for Lightman Drum Company, November 12, 1974. (2 pages consecutive)
25.	Memorandum from David Van Eck, NJDEP, HSMS IV, Bureau of Planning and Assessment, to Albert Pleva, NJDEP, Acting Section Chief, Bureau of Planning and Assessment, Subject: Lightman Drum Company, Inc., Route 73, Cedarbrook, Winslow Twp., Camden Co., NJ, unknown date. (17 pages, consecutive)

REFERENCES

Reference Number	Description of the Reference
26.	Record of Meeting between Steven McNulty, Malcolm Pirnie, Inc., and Charles Stevenson, Director of Utilities, Township of Winslow, New Jersey, Subject: Drinking Water Supply Information, March 17, 1999. Includes Attachments (11 pages, non-consecutive)
27.	Record of Telephone Conversation between Lisa Greco, Malcolm Pirnie, Inc., and Dee Hart, Winslow Twp. Board of Education, Subject: School Populations, March 17, 1999. (1 page)
28.	Household, Family, and Group Quarter Characteristics, 1990. (1 page)
29.	Monitoring Well and Soil Sampling Data Sheets, INTEX, for Lightman Drum Company, various dates. (50 pages, non-consecutive)
30.	Four-mile Vicinity Map for the Lightman Drum Company site, compiled from U.S. Geological Survey (U.S.G.S.) Maps, 7.5 Minute Series, "Clementon, New Jersey, 1967"; "Medford Lakes, New Jersey, 1967"; "Williamstown, New Jersey, 1966, photorevised 1981"; "Hammonton, New Jersey, 1966, photorevised 1981." (1 sheet)
31.	Well Location Map, Lightman Drum Company and Vicinity, Winslow Twp., New Jersey, source: Alfred E. Patton Street Map, date unknown. (1 page)
32.	Record of Telephone Conversation between Lisa Greco, Malcolm Pirnie, Inc., and Mary Sader, Chesilhurst Municipal Building, Subject: Drinking Water Information, March 25, 1999. (1 page)
33.	Record of Telephone Conversation between Lisa Greco, Malcolm Pirnie, Inc., and Janet Drialo, Waterford Township Municipal Utilities Authority, Subject: Drinking Water Information, March 25, 1999. (1 page)
34.	Revised Work Plan for RI, Lightman Drum Company, Inc., prepared by INTEX, January 1989. (63 pages, consecutive)
35.	Letter from James J. Groome, NJDEP, Section Chief, Bureau of State Case Management, to Mr. Jerome Lightman, Lightman Drum Company, Inc., Subject: RI Work Plan Dated September 1988, December 19, 1988. (4 pages, consecutive)
36.	Letter from David Sweeney, NJDEP, Section Chief, Bureau of State Case Management, to Mr. Jerome Lightman, Lightman Drum Company, Inc., Subject: Revised RI Work Plan, January 1989, February 22, 1989. (2 pages, consecutive)
37.	Letter from Gay Dreamer, INTEX, Inc., to Mr. Nicholas Eisenhauer, NJDEP, Bureau of Case Management, Subject: Work Plan Addendum, March 8, 1989. (6 pages, consecutive)

REFERENCES

Reference Number	Description of the Reference
38.	Letter from Joseph A. Rogalski, NJDEP, Assistant Director, Field Operations, Compliance, and Enforcement, to Mr. Jerome Lightman, Lightman Drum Company, Inc., Subject: Penalty Settlement Offer, October 10, 1984. (6 pages, consecutive)
39.	Letter from Joseph A. Rogalski, NJDEP, Assistant Director, Field Operations, Compliance, and Enforcement, to Lightman Drum Company, Subject: Penalty Settlement Offer, March 14, 1986. (5 pages, consecutive)
40.	Record of Correspondence from Lisa Greco, Malcolm Pirnie, Inc., to File, Subject: Off-site Reconnaissance, May 14, 1999. (1 page)
41.	Federal Register/ Vol.45, No. 98/ Monday, May 19,1980/Rules and Regulations, page 33123. (1 page)
42.	Hazardous Waste Investigation, Inspector William Zavacky, Dated 4/24/80, location Lightman Drum Company, Routine Inspection. (3 pages, consecutive)
43.	Hazardous Waste Investigation, Inspector William Zavacky, Dated January 19, 1981 and January 22, 1981, location Lightman Drum Company, Follow-up Inspection. (5 pages, consecutive)
44.	Hazardous Waste Investigation, Inspector William Zavacky, Dated 8/17/82, location Lightman Drum Company, Follow-up Complaint. (4 pages, consecutive)
45.	Memo from Dave Potts, NJDEP, Sr. Env. Spec., to HW/EF 04-06, Dated 10/12/82, Re: Lightman Drum Co. C.E. 10/12/82 follow-up investigation. And Hazardous Waste Investigation, Inspector William Zavacky, Dated 10/12/82, location Lightman Drum Company, Follow-up Complaint. (5 pages, consecutive)
46.	NYSDEC, Septic Tank Cleaner & Industrial Waste Collector Permit, JA-070, Lightman Drum Company, dated April 15, 1981. (1 page)
47.	NYSDEC, Septic Tank Cleaner & Industrial Waste Collector Annual Report, JA-070, Lightman Drum Company, date unknown. (1 page)
48.	Hazardous Waste Investigation, Inspector Charles Elmendorf, Dated 3/7/83, location Lightman Drum Company, Routine Follow-up Inspection. (3 pages, consecutive)
49.	The Merck Index, An Encyclopedia of Chemicals, Drugs, and Biologicals, published by Merck & Co., Inc., 1989. (9 pages, non-consecutive)
50.	Area Map of New Jersey Known Contaminated Site Lists, Known Contaminated Sites Within I mile Radius of Lightman Drum Site. (2 pages consecutive)
51.	Record of Telephone Conversation between Alan Greenlaw, Malcolm Pirnie, Inc., and Charles Steveson, Winslow Twp. Department of Municipal Utilities, Subject: System Interconnection, May 13,1999. (1 page)

SOURCE DESCRIPTION

2.2 Source Characterization

Three sources were used in this evaluation. They include the waste storage tanks, contaminated soil in the drum storage areas, and a pile of drum liners, which ultimately caught on fire (Ref. Nos. 6, p. 10; 4, pp. 1-53; 9, pp. 1-4; 11, p. 2, 19; 17, p. 1; 21, p.1) . In addition to these sources, which are described in the following documentation record, several other potential sources exist but were not scored due to insufficient data being available. These include the following: an unlined waste storage pit used to dispose of paint waste; a warehouse used to store hazardous waste, which was destroyed by a fire; a roll-off dumpster containing sludge (identified as D001 waste) from two underground hazardous waste storage tanks; and two underground diesel fuel tanks (Ref. Nos. 4, p. 10; 8, p. 3; 10, pp. 3-6; 11, p.1; 23, p. 1; 24, pp. 1-2).

Number of the source: 1

Name and description of the source: **Waste Storage Tanks (container)**

This source consists of two underground storage tanks, each with a capacity of five thousand gallons (Ref. Nos. 6, p. 10; 9, pp. 1-4). During the period of November 2, 1978 through April 30, 1979, Lightman used these tanks to store waste paint pigments and thinners (Ref. Nos. 6, p. 10; 7, p. 1; 8, p. 2; 9, pp. 1-4; 12, p. 1). These tanks were subsequently removed following the refusal by the New Jersey Department Environmental Protection (NJDEP) to renew Lightman's Temporary Operating Authority (TOA) to operate as a hazardous waste facility (Ref. Nos. 8, p. 3; 7, p. 1; 6, p. 10; 12, p. 1; 13, p. 1).

On May 28, 1979, five thousand gallons of RCRA waste category F were pumped from the tanks and disposed of as hazardous waste at All County Environmental Services, Warwick, New York (Ref. Nos. 6, p. 10; 8, pp. 2-3; 14, p. 1). A similar event occurred on August 18, 1983 when an additional five thousand gallons of RCRA category F003 waste was disposed of as hazardous waste at S&W Waste Treatment of South Kearny, New Jersey (Ref. Nos. 8, p. 3; 11, p. 1; 15, pp. 1-2). (Note: Pre-1980 RCRA did not have subclassifications for F category waste.) EPA hazardous waste number F003 is defined as the spent non-halogenated solvents, xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, n-butyl alcohol, cyclohexanone, and the still bottoms from the recovery of these solvents (Ref. No. 41, p. 1).

The tanks were excavated in the spring of 1984, and during a site inspection by the NJDEP on July 12, 1984, it was documented that the tanks had been removed (Ref. Nos. 8, p. 3; 11, p. 1). Observations recorded during an August 9, 1984 NJDEP site inspection, following the excavation of the tanks, indicated that one of the tanks was in poor condition, showing signs that the contents of the tank had leaked onto the surrounding soils (Ref. Nos, 6, p. 10; 8, p. 3; 11, pp. 1-2; 48, pp. 1-3).

Location of the source, with reference to a map of the Site:

The waste storage tanks are located approximately 540 feet west of the warehouse in the center of the site property (Ref. No. 4, p. 8). The location of the waste storage tanks are shown on Figure 2, Soil Sampling Locations, prepared as part of the Phase II RI (Ref. No. 4, p. 8).

Containment

Release to ground water

The waste storage tanks, which were installed below ground, had no liner, vault system or double lined tank system and were observed to be unsound (Ref. No. 6, p. 10; 8, p. 3; 9, pp. 1-4; 11, pp. 1-2; 48, pp. 1-3). Observations recorded during an August 9, 1984 NJDEP site inspection, following the excavation of the tanks, indicated that one of the tanks was in poor condition, showing signs that the contents of the tank had leaked onto the surrounding soils (Ref. Nos, 6, p. 10; 8, p. 3; 11, pp. 1-2; 48, pp. 1-3). According to HRS Section 3.12.1, Table 3-2, a containment factor of 10 is assigned for this source (score 10) (Ref. Nos. 1, Section 3.12.1 - Table 3-2; Documentation Record Section 3.1.1).

Gas Release to air

Not Scored

Particulate release to air

Not Scored

Release via overland migration and/or flood

Not Scored

2.4.1 Hazardous Substances

Source Hazardous Substances	Evidence
Xylene	USEPA defined F003 hazardous waste (Ref. Nos. 14, p. 1; 15, p. 1; 41, p. 1).
Acetone	USEPA defined F003 hazardous waste (Ref. Nos. 14, p. 1; 15, p. 1; 41, p. 1).
Ethyl acetate	USEPA defined F003 hazardous waste (Ref. Nos. 14, p. 1; 15, p. 1; 41, p. 1).
Ethyl benzene	USEPA defined F003 hazardous waste (Ref. Nos. 14, p. 1; 15, p. 1; 41, p. 1).
Ethyl ether	USEPA defined F003 hazardous waste (Ref. Nos. 14, p. 1; 15, p. 1; 41, p. 1).
N-butyl alcohol	USEPA defined F003 hazardous waste (Ref. Nos. 14, p. 1; 15, p. 1; 41, p. 1).
Cyclohexanone	USEPA defined F003 hazardous waste (Ref. Nos. 14, p. 1; 15, p. 1; 41, p. 1).

Background Hazardous Substances	Evidence	Concentration	Sample Quantitation Limit (SQL)	Units
N/A				

2.4.2. Hazardous Waste Quantity

2.4.2.1.1. Hazardous Constituent Quantity

Hazardous Substance	Constituent Quantity (pounds) (Mass - S)	Reference
10,000 gallons of RCRA category F waste		1, Section 2.4.2.1.1 - Table 2-5; 6, p. 10; 9, pp. 1-4; 14, p.1; 15, p. 1

sum: When evaluating a source using Tier A, the amount of eligible hazardous substances in pounds must be determined (Ref. No. 1, Section 2.4.2.1.1 - Table 2-5). 10,000 gallons of RCRA category F waste were removed from the tanks during two events (Ref. Nos. 14, p. 1; 15, pp. 1-2). During the first action, 5,000 gallons of waste (identified as RCRA category F waste--mixed solvents) were removed. (Note: Pre-1980, RCRA did not have subclassifications for F category hazardous waste. (Ref. No. 14, p. 1). The second 5,000 gallons were specifically identified as F003 wastes on the waste manifest (Ref. No. 15, pp.1-2.) As a conservative measure, the lowest specific gravity of any of the substances present in F003 waste (ethyl ether - $d^{20/4} = 0.7134$) was used to convert gallons to pounds (Ref. No. 49, pp. 1-9). Therefore, 10,000 gallons x 8.337 pounds of water/gallon of water x 0.7134 pound of ethyl ether/pound of water = 59,476.16 pounds (Ref. No. 1, Section 2.4.2.1.1 - Table 2-5; 49, pp. 1-9).

(pounds): 59,476.16

Hazardous Constituent Quantity Value (S): 59,476.16

2.4.2.1.2. Hazardous Wastestream Quantity

Hazardous Wastestream	Quantity (pounds)	Reference

Not Scored

sum: (pounds)

Hazardous Wastestream Quantity Value (W): NS

2.4.2.1.3. Volume

Not Scored

Dimension of source (yd^3 or gallons):

References(s):

Volume Assigned Value: NS

2.4.2.1.4. Area

Not Scored

Area of source (ft^2):

Reference(s):

Area Assigned Value: NS

2.4.2.1.5. Source Hazardous Waste Quantity Value

Source Hazardous Waste Quantity Value: 71,423.08

Reference(s): 1, Section 2.4.2.1.1 - Table 2-5

2.2 Source Characterization

Number of the source: 2

Name and description of the source: **Misc. Contaminated Soil Areas (Contaminated Soil)**

This source consists of contaminated soil located throughout the site property, since drum storage occurred across the majority of the site property (Ref. Nos. 4, pp. 1-53; 9, p. 4; 11, p. 19; 21, p. 1).
Data collected during a 1987 NJDEP site investigation, which was subsequently reported in an April 12, 1988 AO, indicated the presence of butylbenzyl phthalate, bis(2-ethylhexyl)phthalate, di-n-octylphthalate, chromium, cadmium, and lead in the soils from the drum storage area located along the southern property line of the facility (Ref. Nos. 6, pp. 11-12; 8, pp. 1-8; 25, pp. 1-17).

The Lightman Drum Company also held a Septic Tank Cleaner & Industrial Waste Collector Permit (permit #JA-070) granted by the New York State Department of Environmental Conservation (NYSDEC), to handle the following types of waste; chlorinated solvents, non-chlorinated solvents, mineral spirits and enamel, cyanide wastes, and rubber wastes (Ref. No. 46, p. 1). In the Septic Tank Cleaner and Industrial Waste Collector Annual Report the following substances and volumes handled by Lightman were reported to the NYSDEC; 8,000 gallons of oil, 20,000 gallons of solvents, 3,630 gallons of acid, and 35,200 gallons of PCB (Ref. No. 47, p. 1).

In 1990, in accordance with the April 12, 1988 AO, a contractor for Lightman, conducted a Phase II RI (Ref. Nos. 6, pp. 11-12; 8, pp. 1-8). During the Phase II, four main drum storage areas were identified and investigated (Ref. No. 4, pp. 8, 12-20, 23-24). These four areas encompass Area 8s, Area SS-10, Area MW-5, and the Trailer Parking Area (Ref. No. 4, pp. 8, 12-20, 23-24).

Numerous surface and subsurface soil samples were collected from the various drum storage areas (Ref. No. 4, pp. 8, 12-14). Analysis of five subsurface soil samples (collected from 4-5 feet below the surface) collected from Area 8s indicated the presence of di-n-butyl phthalate and bis(2-ethylhexyl)phthalate at levels significantly greater than levels found in areas less actively used (Ref. No. 4, pp. 8, 15-17). Numerous inorganic analytes were also detected in the data collected during the Lightman RI, however, these results cannot be used in this evaluation since no comparable background samples were collected and these analytes are naturally occurring (Ref. No. 4, pp. 1-53).

Fifteen samples (both surface and subsurface) were collected from Area SS-10 (Ref. No. 4, pp. 14-18). Analysis of these samples showed that the following organic contaminants were present at levels significantly greater than levels found in areas less actively used; di-n-butyl phthalate, bis(2-ethylhexyl)phthalate, benzoic acid, diethylphthalate, butylbenzyl phthalate, and di-n-octylphthalate (Ref. No. 4, pp. 8, 12-14). Inorganic analytes were also detected in the data collected during the Lightman RI, however, these results cannot be used in this evaluation since no comparable background samples were collected and these analytes are naturally occurring (Ref. No. 4, pp. 1-53).

Soil samples were also collected adjacent to Area SS-10, during the installation of monitoring wells MW2b and MW8b (Ref. No. 4, pp. 8, 27-29). Two samples were collected at different depths from the MW8b boring and a single sample was collected from the MW2b boring (Ref. No. 4, pp. 8, 27-29). Analysis of these soil samples indicated the presence of the following organic contaminants at levels significantly greater than levels found in areas less actively used; methylene chloride, carbon disulfide, 1,1-dichloroethylene (DCE), 1,1-dichloroethane (DCA), 1,2- trans-DCE, chloroform, TCE, PCE, 1,1,1-TCA, bis(2-ethylhexyl)phthalate, 1,2-diphenylhydrazine, benzoic acid, butylbenzyl phthalate, and 1,2,4-trichlorobenzene (Ref. No. 4, pp. 8, 11, 27-28). Numerous inorganic contaminants were also detected in the data collected during the Lightman RI, however, these results cannot be used in this evaluation since no comparable background samples were collected and these analytes are naturally occurring (Ref. Nos. 4, pp. 8, 27-29).

In Area MW5, four soil samples (two surface and two subsurface) were collected (Ref. No. 4, pp. 8, 18-20). The analytical results indicated that the following organic contaminants were present at levels significantly greater than levels found in areas less actively used; di-n-butyl phthalate, bis(2-ethylhexyl)phthalate, benzoic acid, diethyl phthalate, and butylbenzyl phthalate (Ref. No. 4, pp. 8, 18-20). Inorganic analytes were also detected in the data collected during the Lightman RI, however, these results cannot be used in this evaluation since no comparable background samples were collected (Ref. No. 4, pp. 1-53).

Two surface soil samples were collected in the Trailer Parking Area, the area where trailers were used to store drums prior to shipment off-site (Ref. No. 4, pp. 23-24). Analysis of one of these samples indicated the presence of di-n-butyl phthalate, bis(2-ethylhexyl)phthalate, di-n-octyl phthalate, and isophorone (Ref. No. 4, pp. 23-24). Inorganic analytes were also detected in the data collected during the Lightman RI, however, these results cannot be used in this evaluation since no comparable background samples were collected (Ref. No. 4, pp. 1-53).

In addition to the areas discussed above five subsurface soil samples were also collected in the area of the excavated underground waste storage tanks (Ref. No. 4, pp. 8). Analysis of these samples (collected from depths ranging from 9.5 to 10.5 feet) indicated the presence of the following organic contaminants at levels significantly greater than levels found in areas less actively used; methylene chloride, di-n-butyl phthalate, bis(2-ethylhexyl)phthalate, 1,1,1-TCA, TCE, and PCE (Ref. Nos. 4, pp. 8, 20-23; 34, pp. 45-63).

Two on-site samples (CA3764 and CA3795) are being used as background samples. These samples were collected from areas less actively used during operations at Lightman. Sample CA3764 was collected in the Trailer Parking Area and analyzed for PP+40 compounds (Ref.No.4, pp. 8, 23-24). Sample CA3795 was collected from Area SS-10 and was analyzed for semivolatile compounds (Ref. No. 4, pp. 8, 17).

Location of the source, with reference to a map of the Site:

Drum storage occurred across the majority of the site property (Ref. Nos. 4, p. 8; 42, p. 3; 43, p. 2; 44, p. 3; 45, p. 4). However, the four main drum storage areas identified during the Phase II are located in the following areas: 1) Area 8s is located approximately 360 feet west of the warehouse in the center of the property; 2) Area SS-10 is located along the southern property line of the site approximately 400-600 feet west of the warehouse; 3) Area MW5 is located along the southern property line of the property approximately 270 feet west of the warehouse; 4) the Trailer Parking Area encompasses two locations; Area #1 is located approximately 60 feet west of the warehouse and 90 feet from the northern property line and Area #2 is located approximately 330 feet west of the warehouse in the center of the property (Ref. No. 4, p. 8). These locations are shown on Figure 2, Soil Sampling Locations, prepared as part of the Phase II RI (Ref. No. 4, p. 8).

Containment

Release to ground water

The waste source (contaminated soil) does not have a maintained, engineered cover, a run-on control system, or a runoff management system (Ref. No. 4, pp. 48-52). According to HRS Section 3.1.2.1, Table 3-2, a containment factor of 10 is assigned for this source (score 10).

Gas Release to air

Not Scored

Particulate release to air

Not Scored

Release via overland migration and/or flood

Not Scored

2.4.1 Hazardous Substances

Source Hazardous Substances	Evidence
Cadmium	The April 12, 1988 AO indicated that cadmium was present in soils from the drum storage area located along the southern property line of the facility (Ref. No. 8, pp. 3-4).
Chromium	The April 12, 1988 AO indicated that chromium was present in soils from the drum storage area located along the southern property line of the facility (Ref. No. 8, pp. 3-4).
Lead	The April 12, 1988 AO indicated that lead was present in soils from the drum storage area located along the southern property line of the facility (Ref. No. 8, pp. 3-4).

Source Hazardous Substances	Evidence	Concentration	Sample Quantitation Limit (SQL)	Units
Methylene Chloride	CA3760(MW8b) (Ref. No. 4, pp. 8, 11, 28)	25.3	(1)	µg/kg[(2)]
Carbon Disulfide	CA3760(MW8b) (Ref. No. 4, pp. 8, 11, 28)	8.76	(1)	µg/kg
1,1-DCE	CA3760(MW8b) (Ref. No. 4, pp. 8, 11, 28)	10.3	(1)	µg/kg
	CA3757(MW2b) (Ref. No. 4, pp. 8, 11, 28)	2.37	(1)	µg/kg
1,1-DCA	CA3760(MW8b) (Ref. No. 4, pp. 8, 11, 28)	13.3	(1)	µg/kg
	CA3757(MW2b) (Ref. No. 4, pp. 8, 11, 28)	2.36	(1)	µg/kg
1,2-trans-DCE	CA3760(MW8b) (Ref. No. 4, pp. 8, 11, 28)	11	(1)	µg/kg

Source Hazardous Substances	Evidence	Concentration	Sample Quantitation Limit (SQL)	Units
Chloroform	CA3760(MW8b) (Ref. No. 4, pp. 8, 11, 28)	11.5	(1)	µg/kg
	CA3757(MW2b) (Ref. No. 4, pp. 8, 11, 28)	2.2	(1)	µg/kg
TCE	CA3761 (Ref. Nos. 4, pp. 8, 11, 22; 8, p. 3)	62.6	(1)	µg/kg
	CA3757(MW2b) (Ref. Nos. 4, pp. 8, 11, 28; 8, p. 3)	9.5	(1)	µg/kg
PCE	CA3761 (Ref. Nos. 4, pp. 8, 11, 22; 8, p. 3)	79.1	(1)	µg/kg
	CA3757(MW2b) (Ref. Nos. 4, pp. 8, 11, 28; 8, p. 3)	7.1	(1)	µg/kg
1,1,1-TCA	CA3760(MW8b) (Ref. No. 4, pp. 8, 11, 28)	10.3	(1)	µg/kg
	CA3761 (Ref. No. 4, pp. 8, 11, 21-22)	5.7	(1)	µg/kg
di-n-butyl phthalate	CA3765 (Ref. No. 4, pp. 8, 11, 15)	645 J[3]B[4]	(1)	µg/kg
	CA3791 (Ref. No. 4, pp. 8, 11, 16)	557	(1)	µg/kg
	CA3803 (Ref. No. 4, pp. 8, 11, 17)	814	(1)	µg/kg
	CA3806 (Ref. No. 4, pp. 8, 11, 17)	3,670	(1)	µg/kg
	CA3898 (Ref. No. 4, pp. 8, 11, 24)	873	(1)	µg/kg
bis(2-ethylhexyl) phthalate	CA3793 (Ref. No. 4, pp. 8, 11, 13)	249	(1)	µg/kg
	CA3765 (Ref. No. 4, pp. 8, 11, 15)	11,000J[3] B[4] D[5]	(1)	µg/kg

Source Hazardous Substances	Evidence	Concentration	Sample Quantitation Limit (SQL)	Units
bis(2-ethylhexyl) phthalate	CA3799 (Ref. No. 4, pp. 8, 11, 16	725	(1)	µg/kg
	CA3791 (Ref. No. 4, pp. 8, 11, 16)	12,300	(1)	µg/kg
	CA3801 (Ref. No. 4, pp. 8, 11, 16)	387	(1)	µg/kg
	CA3803 (Ref. No. 4, pp. 8, 11, 17)	1,460	(1)	µg/kg
	CA3806 (Ref. No. 4, pp. 8, 11, 17)	3,120	(1)	µg/kg
	CA3905 (Ref. No. 4, pp. 8, 11, 19)	545	(1)	µg/kg
	CA3904 (Ref. No. 4, pp. 8, 11, 19)	301	(1)	µg/kg
	CA3907 (Ref. No. 4, pp. 8, 11, 19)	473	(1)	µg/kg
	CA3906 (Ref. No. 4, pp. 8, 11, 19)	621	(1)	µg/kg
	CA3898 (Ref. No. 4, pp. 8, 11, 24)	18,000	(1)	µg/kg
	CA3766 (Ref. No. 4, pp. 8, 11, 21-23; 8, p. 3)	342	(1)	µg/kg
1,2-diphenyl-hydrazine	CA3760(MW8b) (Ref. No. 4, pp. 8, 11, 28)	1,940	(1)	µg/kg
benzoic acid	CA3765 (Ref. No. 4, pp. 8, 11, 15)	2,320J[3]	(1)	µg/kg
	CA3905 (Ref. No. 4, pp. 8, 11, 19)	44.7	(1)	µg/kg
	CA3760(MW8b) (Ref. No. 4, pp. 8, 11, 28)	102	(1)	µg/kg

Source Hazardous Substances	Evidence	Concentration	Sample Quantitation Limit (SQL)	Units
diethyl phthalate	CA3765 (Ref. No. 4, pp. 8, 11, 15)	142J[3]	(1)	µg/kg
	CA3796 (Ref. No. 4, pp. 8, 11, 16)	54	(1)	µg/kg
	CA3803 (Ref. No. 4, pp. 8, 11, 17)	3,780	(1)	µg/kg
	CA3806 (Ref. No. 4, pp. 8, 11, 17)	1,380	(1)	µg/kg
	CA3905 (Ref. No. 4, pp. 8, 11, 19)	23.8	(1)	µg/kg
butylbenzyl phthalate	CA3765 (Ref. No. 4, pp. 8, 11, 15)	2,230	(1)	µg/kg
	CA3791 (Ref. No. 4, pp. 8, 11, 16)	375	(1)	µg/kg
	CA3801 (Ref. No. 4, pp. 8, 11, 16)	59.3	(1)	µg/kg
	CA3806 (Ref. No. 4, pp. 8, 11, 17)	481	(1)	µg/kg
	CA3905 (Ref. No. 4, pp. 8, 11, 19)	132	(1)	µg/kg
	CA3760(MW8b) (Ref. No. 4, pp. 8, 11, 28)	184	(1)	µg/kg
1,2,4-trichloro-benzene	CA3760(MW8b) (Ref. No. 4, pp. 8, 11, 28)	569	(1)	µg/kg

Source Hazardous Substances	Evidence	Concentration	Sample Quantitation Limit (SQL)	Units
di-n-octyl phthalate	CA3765 (Ref. No. 4, pp. 8, 11, 15)	995	(1)	µg/kg
	CA3799 (Ref. No. 4, pp. 8, 11, 16)	70	(1)	µg/kg
	CA3898 (Ref. No. 4, pp. 8, 11, 24)	2,010	(1)	µg/kg
isophorone	CA3765 (Ref. No. 4, pp. 8, 11, 15)	44.7J[(3)]	(1)	µg/kg
	CA3898 (Ref. No. 4, pp. 8, 11, 24)	1,290	(1)	µg/kg

Notes:

(1) - The SQL is the Method Detection Limit (MDL) corrected for dilutions, percent solids (for soils), and other sample specific factors (Ref. No. 1, Section 1.1). The raw data is not available for this site in order to obtain the dilution factors and/or percent solids; however, the Phase II RI Report submitted for this site indicates that only parameters whose concentrations exceed the minimum detectable limits were listed in the report (Ref. No. 4, p. 11).

(2) - µg/kg - microgram per kilogram

(3) - All results for sample CA3765 have been qualified as estimated "J" due to low surrogate percent recovery, except for diethylphthalate and di-n-octylphthalate (Ref. No. 5, pp. 3, 5). Although the data are qualified as estimated, qualitatively, the data are still valid (Ref. No. 5, pp. 3, 5).

(4) - The following footnote was applied to the data by the NJDEP Data Validator; "The value reported is five times greater than in the method blank and is considered real. However, the reported value must be qualified due to method blank contamination. The B qualifier alerts the end use that a reportable quantity of the analyte was detected" (Ref. No. 5, pp. 5, 11). Although the data are qualified as estimated, qualitatively, the data are still valid (Ref. No. 5, pp. 5, 11).

(5) - The following footnote was applied to the data by the NJDEP Data Validator; "The laboratory was required to dilute the sample to bring the peaks onto scale. The CLP program requires dilutions to be indicated with a D. The data reported was adjusted by the data validator and is explained as follows; "the laboratory failed to take percent moisture into consideration when calculating the concentrations" (Ref. No. 5, pp. 5, 10). Although the data are qualified as estimated, qualitatively, the data are still valid (Ref. No. 5, pp. 5, 10).

Background Hazardous Substances	Evidence	Concentration	Sample Quantitation Limit(SQL)[1]	Units
methylene chloride	CA3764 (Ref. No. 4, pp. 8, 11, 23)	3.3	(1)	µg/kg[(2)]
carbon disulfide	CA3764 (Ref. No. 4, pp. 8, 11, 23)	non-detect	(1)	µg/kg
1,1-DCE	CA3764 (Ref. No. 4, pp. 8, 11, 23)	non-detect	(1)	µg/kg
1,1-DCA	CA3764 (Ref. No. 4, pp. 8, 11, 23)	non-detect	(1)	µg/kg
1,2-trans-DCE	CA3764 (Ref. No. 4, pp. 8, 11, 23)	non-detect	(1)	µg/kg
chloroform	CA3764 (Ref. No. 4, pp. 8, 11, 23)	non-detect	(1)	µg/kg
TCE	CA3764 (Ref. No. 4, pp. 8, 11, 23)	non-detect	(1)	µg/kg
PCE	CA3764 (Ref. No. 4, pp. 8, 11, 23)	non-detect	(1)	µg/kg
1,1,1-TCA	CA3764 (Ref. No. 4, pp. 8, 11, 23)	non-detect	(1)	µg/kg
di-n-butyl phthalate	CA3764 (Ref. No. 4, pp. 8, 11, 23)	91.9	(1)	µg/kg
	CA3795 (Ref. No. 4, pp. 8, 13-18)	non-detect	(1)	µg/kg
bis(2-ethylhexyl) phthalate	CA3764 (Ref. No. 4, pp. 8, 11, 23)	78.5	(1)	µg/kg
	CA3795 (Ref. No. 4, pp. 8, 13-18)	non-detect	(1)	µg/kg
1,2-diphenyl-hydrazine	CA3764 (Ref. No. 4, pp. 8, 11, 23)	non-detect	(1)	µg/kg
	CA3795 (Ref. No. 4, pp. 8, 13-18)	non-detect	(1)	µg/kg

Background Hazardous Substances	Evidence	Concentration	Sample Quantitation Limit(SQL)[1]	Units
benzoic acid	CA3764 (Ref. No. 4, pp. 8, 11, 23)	non-detect	(1)	µg/kg
	CA3795 (Ref. No. 4, pp. 8, 13-18)	non-detect	(1)	µg/kg
diethyl phthalate	CA3764 (Ref. No. 4, pp. 8, 11, 23)	non-detect	(1)	µg/kg
	CA3795 (Ref. No. 4, pp. 8, 13-18)	non-detect	(1)	µg/kg
butylbenzyl phthalate	CA3764 (Ref. No. 4, pp. 8, 11, 23)	non-detect	(1)	µg/kg
	CA3795 (Ref. No. 4, pp. 8, 13-18)	non-detect	(1)	µg/kg
1,2,4-trichloro-benzene	CA3764 (Ref. No. 4, pp. 8, 11, 23)	non-detect	(1)	µg/kg
	CA3795 (Ref. No. 4, pp. 8, 13-18)	non-detect	(1)	µg/kg
di-n-octyl phthalate	CA3764 (Ref. No. 4, pp. 8, 11, 23)	non-detect	(1)	µg/kg
	CA3795 (Ref. No. 4, pp. 8, 13-18)	non-detect	(1)	µg/kg
isophorone	CA3764 (Ref. No. 4, pp. 8, 11, 23)	non-detect	(1)	µg/kg
	CA3795 (Ref. No. 4, pp. 8, 13-18)	non-detect	(1)	µg/kg

Notes:

(1) - The SQL is the Method Detection Limit (MDL) corrected for dilutions, percent solids (for soils), and other sample specific factors (Ref. No. 1, Section 1.1). The raw data is not available for this site in order to obtain the dilution factors and/or percent solids; however, the Phase II RI Report submitted for this site indicates that only parameters where concentrations exceed the minimum detectable limits were listed in the report (Ref. No. 4, p. 11).

(2) - µg/kg - microgram per kilogram

2.4.2. Hazardous Waste Quantity

2.4.2.1.1. Hazardous Constituent Quantity

Not Scored

Hazardous Substance	Constituent Quantity (pounds) (Mass - S)	Reference

sum: (pounds)

Hazardous Constituent Quantity Value (S): NS

2.4.2.1.2. Hazardous Wastestream Quantity

Hazardous Wastestream	Quantity (pounds)	Reference

Not Scored

sum: (pounds)

Hazardous Wastestream Quantity Value (W): NS

2.4.2.1.3. Volume

Not Scored

Dimension of source (yd^3 or gallons):

References(s):

Volume Assigned Value: NS

2.4.2.1.4. Area

An area of contaminated soil cannot be defined since a scaled map showing the drum storage areas is not available, therefore, the area of contaminated soil will be conservatively measured as an area of greater than zero (0) square feet (ft^2) (Ref. Nos. 1, Section 2.4.2.1.4 - Table 2-5; 4, p. 8). An area of greater than zero ft^2 can be presumed since there are numerous samples which demonstrate that contamination is present throughout the site (Ref. No. Documentation Record Section 2.4.1).

The Hazardous Waste Quantity (HWQ) value was determined as follows, as stated in Table 2-5 of the HRS Rule (Ref. No. 1, Section 2.4.2.1.4 - Table 2-5):

Area of contaminated soil (ft^2)/ 34000 = HWQ
HWQ = >0 (ft^2) / 34000 = > 0

Area of source (ft^2): >0

Reference(s): Ref. No. 1, Section 2.4.2.1.4 - Table 2-5

Area Assigned Value: >0

2.4.2.1.5. Source Hazardous Waste Quantity Value

Source Hazardous Waste Quantity Value: > 0

2.2 Source Characterization

Number of the source: 3

Name and description of the source: **Plastic Drum Liners (Pile)**

This source consists of a pile of plastic drum liners accumulated by Lightman Drum as part of its drum recycling operations (Ref. Nos. 11, p. 2; 17, p. 1). A section of the plastic drum liner pile burned and the two subsequent reports following the fire give the best description of the size of the pile and the contents of some of the drums (Ref. Nos. 16, p. 3; 17, p. 1). The NJDEP reported the maximum size of the pile as approximately 32' x 42' x 5' and containing as many as 200 liners, while the Camden Fire Marshal reported the size as 50' x 100' and containing approximately 200 plastic drum liners (Ref. Nos. 16, p. 3; 17, p. 1).

Residual amounts of hazardous substances were observed in some of the liners (Ref. Nos. 16, p. 3; 17, p. 1). In addition, several of the liners had manufacture labels which identified the following chemicals; hydrofluoric acid, 2,4-pentanedione, phosphoric acid, dichromate, and sulfamate (Ref. Nos. 11, pp. 2, 7; 16, p. 3; 17, pp. 1-2). It was further observed that some of the liners had lids removed while others had holes (Ref. No. 16, pp. 3-4).

Location of the source, with reference to a map of the site:

The plastic drum liner pile was located on the southwest portion of the site property (Ref. Nos. 11, p. 19; 16, p. 6; 21, p. 1). The location of the plastic drum liner pile is shown on the map prepared as part of the Fire Marshall's investigation (Ref. No. 16, p. 6).

Containment

Release to ground water

The waste source (pile) does not have a maintained, engineered cover, a run-on control system, or a runoff management system, therefore, a containment factor of 10 is assigned to this source (Ref. Nos. 1, Section 3.1.2.1 - Table 3-2; 11, p. 19; 16, p. 6; 19).

Gas Release to air

Not Scored

Particulate release to air

Not Scored

Release via overland migration and/or flood

Not Scored

2.4.1 Hazardous Substances

Source Hazardous Substances	Evidence
hydrofluoric acid	The presence of this compound is documented by direct observations made during the Fire Marshall investigation of the drum liner fire and in several NJDEP site investigation reports (Ref. Nos. 10, p. 4; 11, pp. 2, 7; 16, pp. 1-11; 17, p. 1).
2,4-pent-anedione	The presence of this compound is documented by direct observations made during the Fire Marshall investigation of the drum liner fire and in the NJDEP site investigation reports (Ref. No. 16, pp. 1-11).
phosphoric acid	The presence of this compound is documented by direct observations made during the Fire Marshall investigation of the drum liner fire and in the NJDEP site investigation reports (Ref. Nos. 11, p. 2; 16, pp. 1-11).
dicromate	The presence of this compound is documented by direct observations made during the Fire Marshall investigation of the drum liner fire and in the NJDEP site investigation reports (Ref. No. 16, pp. 1-11).
sulfamate	The presence of this compound is documented by direct observations made during the Fire Marshall investigation of the drum liner fire and in the NJDEP site investigation reports (Ref. No. 16, pp. 1-11).

2.4.2. Hazardous Waste Quantity

2.4.2.1.1. Hazardous Constituent Quantity

Not Scored

Hazardous Substance	Constituent Quantity (pounds) (Mass - S)	Reference

Not Scored

sum: (pounds)

Hazardous Constituent Quantity Value (S): NS

2.4.2.1.2. Hazardous Wastestream Quantity

Hazardous Wastestream	Quantity (pounds)	Reference
Not Scored		

sum: (pounds)

Hazardous Wastestream Quantity Value (W): NS

2.4.2.1.3. Volume

Not Scored

Dimension of source (yd^3 or gallons):

Volume Assigned Value: NS

2.4.2.1.4. Area

The area of the pile was calculated based on information contained in an NJDEP report, which lists the area of the pile as 32' X 42' (Ref. No. 17, p. 1). Therefore, the area of the pile equals (32 X 42 =) 1,344 ft^2 (Ref. No. 17, p. 1). It should be noted that the Camden County Fire Marshal reported the size of the pile as 50' X 100'; however, for this evaluation the most conservative measure of the pile was used (Ref. Nos. 16, p. 3; 17, p. 1).

The Hazardous Waste Quantity (HWQ) value was determined as follows, as stated in Table 2-5 of the HRS Rule (Ref. No. 1, Section 2.4.2.1.4 - Table 2-5):

Area of pile (ft^2)/ 13 = HWQ
HWQ = 1,344 (ft^2) / 13 = 103.4

Area of source (ft^2): 1,344

Reference(s): Ref. No. 1, Section 2.4.2.1.4 - Table 2-5

Area Assigned Value: 103.4

2.4.2.1.5. Source Hazardous Waste Quantity Value

Source Hazardous Waste Quantity Value: 103.4

SITE SUMMARY OF SOURCE DESCRIPTIONS

Source No.	Source Hazardous Waste Quantity Value	Containment			
		Ground Water	Surface Water	Gas	Air Particulate
1	71,423.08	10	NS[1]	NS	NS
2	> 0	10	NS	NS	NS
3	103.4	10	NS	NS	NS

SUM OF HWQ: 71,526.48

Notes:

(1) - NS - Not Scored

3.0 GROUND WATER MIGRATION PATHWAY

3.0.1 GENERAL CONSIDERATIONS

Aquifer/Stratum 1 (shallowest) Kirkwood-Cohansey Aquifer

Aquifer/Stratum Name: Kirkwood-Cohansey Aquifer

Description: The Kirkwood-Cohansey Aquifer immediately underlies the site (Ref. No. 6, pp. 13-14). This aquifer, which is approximately 180 to 200 feet thick, is composed of the Kirkwood Formation and the Cohansey Sand (Ref. Nos. 6, pp. 13-14; 20, pp. 4-7). The Kirkwood Formation consists of fine to medium sand and silty sand with clay beds in the basal part of the formation (Ref. Nos. 6, pp. 13-14; 20, p. 4). Overlying, and interconnected with the Kirkwood Formation is the Cohansey Sand (Ref. Nos. 6, pp. 13-14; 20, pp. 4-7). This formation consists of quartz sand which contains minor amounts of pebbly sand, fine to coarse-grained sand, silty and clayey sand, and interbedded clay (Ref. Nos. 6, pp. 13-14; 20, p. 4). Well logs for the on-site monitoring wells (completed in the Cohansey Sand Aquifer) indicate the presence of fine to coarse sand to a maximum depth of 52 feet (the completion depth of the deepest boring) (Ref. Nos. 6, pp. 66-71; 18, pp. 1-12). Discontinuous layers of silty sand and clay have also been identified (Ref. Nos. 6, pp. 66-71; 18, pp. 1-12; 26, pp. 9-10). The hydraulic conductivity of this stratum is estimated to be 1×10^{-4} centimeters per second (cm/s) (Ref. Nos. 1, Section 3.1.2.4 - Table 3-6; 6, pp. 13-14). Ground water in the Kirkwood-Cohansey Aquifer flows to the south, with either an easterly or westerly component (based on seasonal variation) (Ref. Nos. 4, p. 41; 6, pp. 48, 61, 81; 22, p. 1). The depth to ground water ranges from 4.0 to 17.3 feet based on the location on-site and seasonal variation (Ref. Nos. 4, p. 41; 6, p. 48).

Due to the presence of clay layers in the Kirkwood-Cohansey Aquifer, a two-mile radius well search was requested from the NJDEP (Ref. No. 19, pp. 1-3). An examination of all available well logs indicates that there is no continuous clay or silt layer in the Kirkwood-Cohansey Aquifer within two miles of the site [(1)] (Ref. Nos. 19, pp. 1-7).

Within four miles of the site, seven public supply wells and numerous private wells utilize the Kirkwood-Cohansey Aquifer as a source of drinking water (Ref. Nos. 19, pp. 8-217; 26, pp. 1-3, 5-6, 11; 27, p. 1; 30; 32, p. 1; 33, p. 1).

(1) Selected well logs for wells within a two-mile radius of the site were obtained from the NJDEP (Ref. No. 19, pp. 1-7). All of the clay and silt layers (greater than three feet in thickness) that are present in these borings are delineated below (Ref. No. 19, pp. 4-7). Intervening layers of sand, gravel, etc. are not delineated (Ref. No. 19, pp. 4-7).

The depths given in the well logs were standardized to mean sea level (msl) (Ref. No. 19, pp. 4-7). Based on this, no continuous clay layer was discovered within two miles of the site (Ref. Nos. 19, pp. 4-7; 30; 31).

Evidence of Discontinuous Clay Layers

Fire Protection Well located at 2nd and Grant Avenues (elevation +160 feet msl)

No clay or silt layers identified (Ref. No. 19, pp. 4-5).

Boring completed at 156 feet (elevation of +4 feet msl) (Ref. Nos. 19, pp. 4-5; 30). This well is located approximately 1.5 miles from the site (Ref. Nos. 19, pp. 4-5; 30; 31).

Observation Well located on Grant Avenue (elevation +160 feet msl)

No clay or silt layers identified (Ref. No. 19, pp. 6-7).

Boring completed at 120 feet (elevation of +40 feet msl) (Ref. Nos. 19, pp. 6-7; 30). The exact street address is not given on the Well Record; however, the street is located between 1.3 and 2 miles from the site (Ref. Nos. 19, pp. 6-7; 30; 31).

3.1 LIKELIHOOD OF RELEASE

3.1.1 OBSERVED RELEASE

Aquifer Being Evaluated: Kirkwood-Cohansey Aquifer

Direct Observation:

- Basis for Direct Observation:

During the Lightman RI, three soil samples were collected during the installation of the on-site monitoring wells (Ref. No. 4, pp. 27-28). Two of these soil samples, CA3760 - MW-8b (depth 19-26 feet) and CA3757 - MW-2b (depth 48-50 feet) were collected from below the water table at the site (Ref. Nos. 4, p. 27; 18, pp. 3, 6; 29, pp. 14-15). Analysis of these soil samples indicated the presence of numerous organic compounds including methylene chloride, carbon disulfide, 1,1-DCE, 1,1-DCA, 1,2-trans-DCE, chloroform, TCE, PCE, 1,1,1-TCA, 1,2-diphenylhydrazine, benzoic acid, butylbenzyl phthalate, and 1,2,4-trichlorobenzene at levels greater than three times the levels detected in the background soil samples (Ref. No. 4, pp. 8, 11-14, 16, 18-20, 23-24, 27-28). Therefore, a release to ground water at the site via direct observation is documented (Ref. Nos. 1, Section 3.1.1; 4, p. 27; 18, pp. 3, 6; 29, pp. 14-15).

- Hazardous Substances in the Release

methylene chloride
carbon disulfide
1,1-DCE
1,1-DCA
1,2-trans-DCE
chloroform
butylbenzyl phthalate
TCE
PCE
1,1,1-TCA
1,2-diphenylhydrazine
benzoic acid
1,2,4-trichlorobenzene

Chemical Analysis:

- Background Concentration

Sample ID	Depth of Screening Interval Below Ground Surface	Date	Reference(s)
MW-1[1] (Lab ID # CA3784)	13.8 - 23.8 feet	6/14/90	4, p. 30; 6, pp. 9, 66; 29, p. 1
MW-6[1] (Lab ID # CA3786)	14 - 24 feet	6/14/90	4, p. 30; 6, pp. 9, 71; 29, p. 7

Notes:

(1) – MW-1 and MW-6 are utilized as background wells since they are both located sidegradient of the site sources (Ref. Nos. 4, p. 8; Documentation Record Section 2.2). Ground water in the Kirkwood-Cohansey Aquifer flows to the south, with either an easterly or westerly component (based on seasonal variation) (Ref. Nos. 4, p. 41; 6, pp. 48, 61, 81; 22, p. 1).

Hazardous Substance	Sample ID	Concentration	Sample Quantitation Limit	Reference(s)
1,2-trans-dichloroethylene	MW-1 (Lab ID # CA3784)	non-detect	(1)	4, pp. 11, 30; 29, p. 1
	MW-6 (Lab ID # CA3786)	non-detect	(1)	4, pp 11, 30; 29, p. 7
trichloroethylene	MW-1 (Lab ID # CA3784)	non-detect	(1)	4, pp. 11, 30; 29, p. 1
	MW-6 (Lab ID # CA3786)	non-detect	(1)	4, pp. 11, 30; 29, p. 7
tetrachloro-ethylene	MW-1 (Lab ID # CA3784)	non-detect	(1)	4, pp. 11, 30; 29, p. 1
	MW-6 (Lab ID # CA3786)	non-detect	(1)	4, pp. 11, 30; 29, p. 7

Notes:

(1) - The SQL is the MDL corrected for dilutions and other sample specific factors (Ref. No. 1, Section 1.1). The raw data is not available for this site in order to obtain the dilution factors; however, the Phase II RI Report submitted for this site indicates that only parameters whose concentrations exceed the minimum detectable limits were listed in the report (Ref. No. 4, p. 11).

- **Contaminated Samples**

Sample ID	Depth of Screening Interval Below Ground Surface	Date	Reference(s)
MW-2[(1)] (Lab ID # CA3778)	11 – 21 feet	6/15/90	4, p. 30; 6, pp. 9, 67; 29, p. 2
MW-3[(1)] (Lab ID # CA3996)	9 – 19 feet	6/14/90	4, p. 30; 6, pp. 9, 68; 29, p. 4
MW-7[(1)] (Lab ID # CA3783)	6 – 16 feet	6/14/90	4, p. 31; 18; p. 1; 22, p. 1; 29, p. 8
MW-8a[(1)] (Lab ID # CA3775)	9 – 19 feet	6/13/90	4, p. 31; 18, p. 2; 22, p. 1; 29, p. 9
MW-10[(1)] (Lab ID # CA3779)	9 - 19 feet	6/13/90	4, p. 31; 18, p. 5; 22, p. 1

Notes:

(1) – These wells are utilized as release wells since they are located downgradient of the site sources (Ref. Nos. 4, p. 8; Documentation Record Section 2.2). Ground water in the Kirkwood-Cohansey aquifer flows to the south, with either an easterly or westerly component (based on seasonal variation) (Ref. Nos. 4, p. 41; 6, pp. 48, 61, 81; 22, p. 1).

Hazardous Substance	Sample ID	Concentration	Sample Quantitation Limit	Reference(s)
1,2-trans-dichloroethylene	MW-3 (Lab ID # CA3996)	16.2 µg/L(1)	(2)	4, pp. 11, 30
	MW-7 (Lab ID # CA3783)	13.5 µg/L	(2)	4, pp. 11, 31; 5, pp. 1-4, 7
trichloroethylene	MW-2 (Lab ID # CA3778)	2,500 µg/L	(2)	4, pp. 11, 30; 5, pp. 1-4, 7
	MW-7 (Lab ID # CA3783)	23.4 µg/L	(2)	4, pp. 11, 31; 5, pp. 1-4, 7
	MW-8a (Lab ID # CA3775)	4,900 µg/L	(2)	4, pp. 11, 31; 5, pp. 1-4, 6
	MW-10 (Lab ID # CA3779)	104 µg/L	(2)	4, pp. 11, 31
tetrachloro-ethylene	MW-3 (Lab ID # CA3996)	18.2 µg/L	(2)	4, pp. 11, 30
	MW-7 (Lab ID # CA3783)	21.1 µg/L	(2)	4, pp. 11, 31; 5, pp. 1-4, 7
	MW-10 (Lab ID # CA3779)	112 µg/L	(2)	4, pp. 11, 31

Notes: (1) - µg/L - micrograms per liter

(2) - The SQL is the Method Detection Limit (MDL) corrected for dilutions and other sample specific factors (Ref. No. 1, Section 1.1). The raw data is not available for this site in order to obtain the dilution factors and/or percent solids; however, the Phase II RI Report submitted for this site indicates that only parameters whose concentrations exceed the minimum detectable limits were listed in the report (Ref. No. 4, p. 11).

Attribution:

The Lightman Drum Company, Inc. began operations in April of 1974 as a Special Waste Facility, drum transfer/recycling facility, and hazardous waste hauler (Ref. Nos. 8, p. 2; 9, pp. 1-3; 12, p. 1; 34, p. 4). Numerous violations of the Solid Waste Management Act were documented over the years, and to date three AOs have been issued by the NJDEP (Ref. Nos. 8, pp. 4-8; 38, pp. 1-6; 39, pp. 1-5). The AO's cite numerous violations including the following: Lightman Drum did not properly register with the NJDEP as a transporter of hazardous waste, Lightman Drum acted as a hazardous waste storage facility without the proper permits and caused the discharge of pollutants as defined in State statutes (Ref. Nos. 8, pp. 4-8; 38, pp.1-6; 39, pp. 1-5).

The April 12, 1988 AO documented the presence of numerous contaminants at the site including 1,2,4-trichlorobenzene, PCE, 1,4-dichlorobenzene, 1,2-dichlorobenzene, 1,3- dichlorobenzene, and bis(2-ethylhexyl)phthalate in the former underground storage tanks locations; butylbenzyl phthalate, bis(2-ethylhexyl)phthalate, di-n-octylphthalate, chromium, cadmium and lead in one of the drum storage areas; and bis(2-ethylhexyl)phthalate, di-n-octylphthalate, aroclor-1254 and cadmium in the area of the former unlined waste storage pit (Ref. Nos. 6, pp.11-12; 8, pp. 1-8; 25, pp. 1-17).

A contractor for Lightman Drum conducted a Phase II RI during 1990 (in accordance with the April AO), during which numerous potential source areas were investigated (Ref. No. 4, pp. 1-53). Analysis of subsurface soil samples collected from the former locations of two underground storage tanks indicated the presence of numerous organic compounds including methylene chloride, di-n-butylphthalate, bis(2-ethylhexyl)phthalate, 1,1,1-TCA, TCE, and PCE (Ref. Nos. 4, pp. 21-22; Documentation Record Section 2.2).

Analysis of soil samples collected from various drum storage areas across the site have also indicated the presence of numerous organic compounds including di-n-butyl phthalate, bis(2-ethylhexyl)phthalate benzoic acid, diethylphthalate, butylbenzyl phthalate, di-n-octylphthalate, methylene chloride, carbon disulfide, 1,1-DCE, 1,1-DCA, 1,2-trans-DCE, chloroform, TCE, PCE, 1,1,1-TCA, 1,2-diphenylhydrazine, isophorone, and 1,2,4-trichlorobenzene (Ref. No. 4, pp. 8, 12-14, 18-20, 23-24, 27-28). It should be noted that two of these soil samples, CA3760 - MW-8b and CA3757 - MW-2b, were collected from below the water table at the site (Ref. Nos. 4, p. 27; 18, pp. 3, 6; 29, pp. 3, 10, 14-15; Documentation Record Section 3.1.1). Therefore, they show a release to ground water at the site via direct observation (Ref. Nos. 1, Section 3.1.1; 4, p. 27; 18, pp. 3, 6; 29, pp. 14-15).

No other sources have been identified in the area as a search of the New Jersey State Known Contaminated Site List database indicated that there are no other potential upgradient sources within a one mile radius of the site (Ref. No. 50, p. 1).

Hazardous Substances Released

methylene chloride
carbon disulfide
1,1-DCE
1,1-DCA
1,2-trans-DCE
chloroform
butylbenzyl phthalate
TCE
PCE
1,1,1-TCA
1,2-diphenylhydrazine
benzoic acid
1,2,4-trichlorobenzene

==========

Ground Water Observed Release Factor Value: 550

3.2 WASTE CHARACTERISTICS

3.2.1 Toxicity/Mobility

Hazardous Substance	Source No.	Toxicity Factor Value	Mobility Factor Value [1]	Toxicity/ Mobility	Reference(s)
Xylene (total)[2]	1	10	1	10	1, Section 3.2.1.2; 2, p. 15
Acetone	1	10	1	10	1, Section 3.2.1.2; 2, p. 1
Ethyl acetate	1	1	1	1	1, Section 3.2.1.2; 2, p. 9
Ethyl benzene	1	10	1	10	1, Section 3.2.1.2; 2, p. 9
Ethyl ether	1	10	1	10	1, Section 3.2.1.2; 2, p. 9
n-Butyl alcohol	1	N/A[3]	N/A	N/A	2, p. 3
Cyclohexanone	1	1	1	1	1, Section 3.2.1.2; 2, p. 5
Cadmium	2	10,000	2×10^{-3}	20	1, Section 3.2.1.2; 2, p. 3
Chromium	2	10,000	0.01	100	1, Section 3.2.1.2; 2, p. 4
Lead	2	10,000	2×10^{-5}	0.2	1, Section 3.2.1.2; 2, p. 10
Methylene Chloride[4]	2	10	1	10	1, Section 3.2.1.2; 2, p. 11
Carbon Disulfide[4]	2	10	1	10	1, Section 3.2.1.2; 2, p. 3
1,1-DCE[4]	2	100	1	100	1, Section 3.2.1.2; 2, p. 6
1,1-DCA[4]	2	10	1	10	1, Section 3.2.1.2; 2, p. 6
1,2-trans-DCE[5]	2	100	1	100	1, Section 3.2.1.2; 2, p. 7
Chloroform[4]	2	100	1	100	1, Section 3.2.1.2; 2, p. 4
TCE[5]	2	10	1	10	1, Section 3.2.1.2; 2, p. 14
PCE[5]	2	100	1	100	1. Section 3.2.1.2; 2, p. 13
1,1,1-TCA[4]	2	1	1	1	1, Section 3.2.1.2; 2, p. 14
Di-n-butylphthalate	2	10	2×10^{-3}	0.02	1, Section 3.2.1.2; 2, p. 6

3.2.1 Toxicity/Mobility (con't)

Hazardous Substance	Source No.	Toxicity Factor Value	Mobility Factor Value [1]	Toxicity/ Mobility	Reference(s)
Bis(2-ethylhexyl) phthalate	2	100	2×10^{-7}	2×10^{-5}	1, Section 3.2.1.2; 2, p. 2
1,2-diphenyl-hydrazine[4]	2	1,000	0.2	200	1, Section 3.2.1.2; 2, p. 8
Benzoic acid[4]	2	1	1	1	1, Section 3.2.1.2; 2, p. 2
Diethylphthalate	2	1	1	1	1, Section 3.2.1.2; 2, p. 7
Butylbenzyl-phthalate[4]	2	10	2×10^{-3}	0.02	1, Section 3.2.1.2; 2, p. 3
1,2,4-Trichloro-benzene[4]	2	100	0.2	20	1, Section 3.2.1.2; 2, p. 14
Di-n-octylphthalate	2	100	2×10^{-7}	2×10^{-5}	1, Section 3.2.1.2; 2, p. 6
Isophorone	2	10	1	10	1, Section 3.2.1.2; 2, p. 10
Hydrofluoric acid	3	N/A	N/A	N/A	2, pp. 1-15
2,4-pentanedione	3	N/A	N/A	N/A	2, pp. 1-15
Phosphoric acid	3	1,000	N/A	N/A	1, Section 3.2.1.2; 2, p. 12
Dichromate	3	N/A	N/A	N/A	2, p. 7
Sulfamate	3	N/A	N/A	N/A	2, p. 13

Notes:

(1) - When assigning the mobility values to these hazardous substances, the categories used for Sources 2 and 3 were non-liquid, non-karst, except where indicated, and the categories used for Source 1 were liquid, non-karst, except where indicated (Ref. Nos. 2, pp. 1-15).

(2) - Xylene (total) is composed of three isomers; meta, para, and ortho (Ref. No. 2, p. 15). The toxicity/mobility assigned to xylene (total) is taken from the isomer with the highest value (i.e., p-xylene) (Ref. No. 2, p. 15).

(3) - N/A (Not Available) - There is no value given for this factor in the Superfund Chemical Data Matrix (SCDM).

(4) – These substances are observed release substances via direct observation, therefore, since they do not meet the criteria for an observed release via chemical analysis they are not automatically assigned a mobility factor value of 1 (Ref. Nos. 1, Section 3.2.1.2; 4, p. 27; 18, pp. 3, 6).

(5) - As a result of an observed release of these substances to the ground water via chemical analysis, the mobility factor value for these substances is 1 (Ref. No. 1, Section 3.2.1.2; Documentation Record Section 3.1.1).

3.2.2 Hazardous Waste Quantity

Source Number	Source Hazardous Waste Quantity Value (Section 2.4.2.1.5)	Is source hazardous constituent quantity data complete? (yes/no)
1	71,423.08	Yes
2	> 0	No
3	103.4	No
SUM OF HWQ:	71,526.48	

Assigned Factor Value: 10,000

Ref. No. 1, Section 2.4.2.2 - Table 2-6

3.2.3 Waste Characteristics Factor Category Value

Toxicity/Mobility Factor Value = Toxicity X Mobility
Toxicity = 1,000
Mobility = 0.2
Toxicity/Mobility Factor Value = 1,000 X 0.2 = 200

Toxicity/Mobility Factor Value X HWQ Factor Value = 200 X 10,000 = 2,000,000

Waste Characteristics Factor Category Value: 32 (as per Table 2-7 in HRS Rule)

Ref. No. 1, Section 2.4.3

Toxicity/Mobility Factor Value X Hazardous Waste Quantity Factor Value: 2 X 10^6

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Hazardous Waste Quantity Factor Value: 10,000
Waste Characteristics Factor Category Value: 32

3.3 TARGETS

Well	Distance From Source	Aquifer	Level I Contam. (Y/N)	Level II Contam. (Y/N)	Potential Contam. (Y/N)	Reference(s)
WTMUA [1] Well No. 1	2.3 miles	Kirkwood-Cohansey	N	N	Y	26, pp. 1-3, 5, 11; 30; 31
WTMUA Well No. 2	2.7 miles	Kirkwood-Cohansey	N	N	Y	26, pp. 1-3, 5, 11; 30; 31
WTMUA Well No. 3	3.7 miles	Kirkwood-Cohansey	N	N	Y	26, pp. 1-3; 5, 11; 30; 31
WTMUA Well No. 4	1.4 miles	Kirkwood-Cohansey	N	N	Y	26, pp. 1-3, 5, 11; 30; 31
WTMUA Well No. 7	3.8 miles	Kirkwood-Cohansey	N	N	Y	26, pp. 1-3, 5, 11; 30; 31
WTMUA Well No. 8	0.9 miles	Kirkwood-Cohansey	N	N	Y	26, pp. 1-3, 5, 11; 30; 31
WTMUA Well No. 9	3.5 miles	Kirkwood-Cohansey	N	N	Y	26, pp. 1-3, 5, 11; 30; 31
Private Wells (3 houses)	0-¼ mile	Kirkwood-Cohansey	N	N	Y	19, pp. 8-217; 26, pp. 1, 11; 30
Private Wells (35 houses)	¼ - ½ mile	Kirkwood-Cohansey	N	N	Y	19, pp. 8-217; 26, pp. 1, 11; 30
Private Wells (162 houses)	½ - 1 mile	Kirkwood-Cohansey	N	N	Y	19, pp. 8-217; 26, pp. 1, 11; 30; 32, p. 1
Private Wells (729 houses)	1 - 2 mile	Kirkwood-Cohansey	N	N	Y	19, pp. 8-217; 26, pp. 1, 11; 30; 32, p. 1; 33, p. 1

Note:

(1) - WTMUA - Winslow Township Municipal Utility Authority

3.3.1 Nearest Well

Well: Private Well
Level of Contamination (I, II, or potential): Potential
If potential contamination, distance from source in miles: 0.19

All of the houses within ¼ mile of the site obtain their drinking water from private wells (Ref. Nos. 26, pp. 1, 11; 30). The nearest house is located 0.19 miles west/southwest from the site (Ref. Nos. 30; 40, p. 1).

==========

Nearest Well Factor Value: 20
(HRS Table 3-11, Section 3.3.1)

3.3.2 Population

3.3.2.1 Level of Contamination

3.3.2.2 Level I Concentrations

Level I Well	Population	Reference

Not Scored

==========

Population Served by
Level I Wells:

Level I Concentrations Factor Value:

3.3.2.3 Level II Concentrations

Level II Well	Population	Reference(s)

Not Scored

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Level II Concentrations Factor Value:

3.3.2.4 Potential Contamination

Distance Category	Population	Reference(s)	Distance-Weighted Population Value (HRS Table 3-12)
0 - ¼ mile	6 people [1]	1, Section 3.3.2.4; 19, pp. 8-217; 26, pp. 1, 11; 28, p. 1; 30	4
¼ - ½ mile	94 people [1]	1, Section 3.3.2.4; 19, pp. 8-217; 26, pp. 1, 11; 28, p. 1; 30	33
½ - 1 mile	3,240 people [1]	1, Section 3.3.2.4; 19, pp. 8-217; 26, pp. 1-3, 5-7, 11; 27, p. 1; 28, p. 1; 30; 32, p. 1; 51, p. 1	1,669
1-2 mile	4,791 people [1]	1, Section 3.3.2.4; 19, pp. 8-217; 26, pp. 1-3, 5-7, 11; 27, p. 1; 28, p. 1; 30; 32, p. 1; 33, p. 1 51, p. 1	939
2-3 mile	5,596 people [1]	1, Section 3.3.2.4; 26, pp. 1-3, 5-7, 11; 27, p. 1; 28, p. 1; 30; 32, p. 1; 33, p. 1; 51, p. 1	678
3-4 mile	8,394 people [1]	1, Section 3.3.2.4; 26, pp. 1-3, 5-7, 11; 27, p. 1; 28, p. 1; 30; 32, p. 1; 33, p. 1; 51, p. 1	417

Note: (1) - The apportionment calculations for the groundwater population are shown below:

Private Wells - A large portion of the population within two miles of the site obtains their drinking water from private wells (Ref. Nos. 19, pp. 8-217; 26, pp. 1, 11; 30; 32, p. 1; 33, p. 1). A house count (based on the U.S.G.S. Topographical Maps) was conducted for those areas not served by public water supplies (Ref. Nos. 26, pp. 1, 11; 30; 32, p. 1; 33, p. 1). In addition, a two-mile radius well search was requested from the NJDEP (Ref. No. 19, pp. 1-3). An examination of wells logs for wells located within two miles of the site indicated that the private wells are predominantly (> 99%) screened in the Kirkwood-Cohansey Aquifer (Ref. Nos. 19, pp. 1-3, 8-217; 30). Altogether, 909 private well logs were present in the NJDEP two-mile search information (Ref. No. 19, pp. 1-3). Eight of the wells were not screened in the Kirkwood-Cohansey Aquifer, and 901 of the wells were screened in the Kirkwood-Cohansey Aquifer (Ref. No. 19, pp. 1-217). Therefore, ((8/909)/ x 100) = 0.88% of the private wells within two miles of the site are not screened in the aquifer of concern (Ref. No. 19, pp. 1-217). It should be noted that a representative selection of well logs is included in reference number 19. Calculations for the number of people served by private wells in each distance ring are given below (Ref. Nos. 26, pp. 1, 11; 30; 32, p. 1; 33, p. 1). The average population per household in Camden County is 2.76 (Ref. No. 28).

Distance Ring	Number of Wells
0 - ¼ mile	3 wells X 0.88% = 0.03 Rounding this up, 1 house will be eliminated and will be considered to screen an aquifer other than the aquifer of concern 2 wells X 2.76 = 6 people

Distance Ring	Number of Wells
¼ - ½ mile	35 wells X 0.88% = 0.31 Rounding this up, 1 house will be eliminated and will be considered to screen an aquifer other than the aquifer of concern 34 wells X 2.76 = 94 people
½ - 1 mile	162 wells X 0.88% = 1.43 Rounding this up, 2 houses will be eliminated and will be considered to screen an aquifer other than the aquifer of concern 160 X 2.76 = 442 people
1 - 2 mile	729 wells X 0.88% = 6.42 Rounding this up, 7 houses will be eliminated and will be considered to screen an aquifer other than the aquifer of concern 722 X 2.76 = 1,993 people

Ref. Nos. 19, pp. 8-217; 26, pp. 1, 11; 30; 32, p. 1; 33, p. 1

Winslow Township Municipal Utility Authority (WTMUA) - WTMUA obtains their potable water from two interconnected systems; the Sickerville System and the Ivystone System (Ref. Nos. 26, pp. 1-11; 51, p. 1). The Sickerville System and Ivystone System are blended systems containing ten wells, seven which draw from the aquifer of concern (Ref. No. 26, pp. 2-3, 5; 51, p. 1). The Sickerville System wells serve 7,067 connections, including five schools, and the Ivystone System wells serve 1,788 connections (Ref. No. 26, pp. 1, 6-7 11). The total population (including faculty and staff) in the five schools is 3,544 (Ref. No. 27, p. 1). Since the average population per household in Camden County is 2.76, these wells serve a residential population of (7,067 + 1,788) = 8,855 X 2.76 = 24,440 people (Ref. Nos. 26, pp. 6-7; 28, p. 1). Therefore, altogether the wells serve (3,544 + 24,440) = 27,984 people (Ref. Nos. 26, pp. 6-7; 27, p. 1; 28, p. 1). As none of the wells provides greater than 40% of the total water to the system, the population is apportioned equally to each well (Ref. No. 26, pp. 2-3). Therefore, each well serves 27,984/10 = 2,798 people (Ref. Nos. 26, pp. 6-7; 27, p. 1; 28, p. 1). Calculations for the number of people served by wells in each distance ring are given below (Ref. Nos. 26, pp. 1-3, 5-7, 11; 27, p. 1; 28, p. 1).

Distance Ring	Number of Wells
0 - ¼ mile	0 wells
¼ - ½ mile	0 wells
½ - 1 mile	1 well X 2,798 = 2,798 people
1 - 2 mile	1 well X 2,798 = 2,798 people
2 - 3 mile	2 wells X 2,798 = 5,596 people
3 - 4 mile	3 wells X 2,798 = 8,394 people

Ref. Nos. 26, pp. 1-3, 5-7, 11; 27, p. 1; 28, p. 1; 30; 31; 51, p. 1

Potential Contamination Factor Value = Distance-weighted population X 0.1

Potential Contamination Factor Value = 3,740 X 0.1 = 374.0

Ref. No. 1, Sections 3.3.2.4 and 3.3.2.5

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Potential Contamination Factor Value: 374.0

3.3.3 RESOURCES

Well	Aquifer	Resource Use	Reference

Not scored

Resources Factor Value:NS

3.3.4 WELLHEAD PROTECTION AREA

Area	Use	Reference	Value

Not scored

Wellhead Protection Area Factor Value:NS

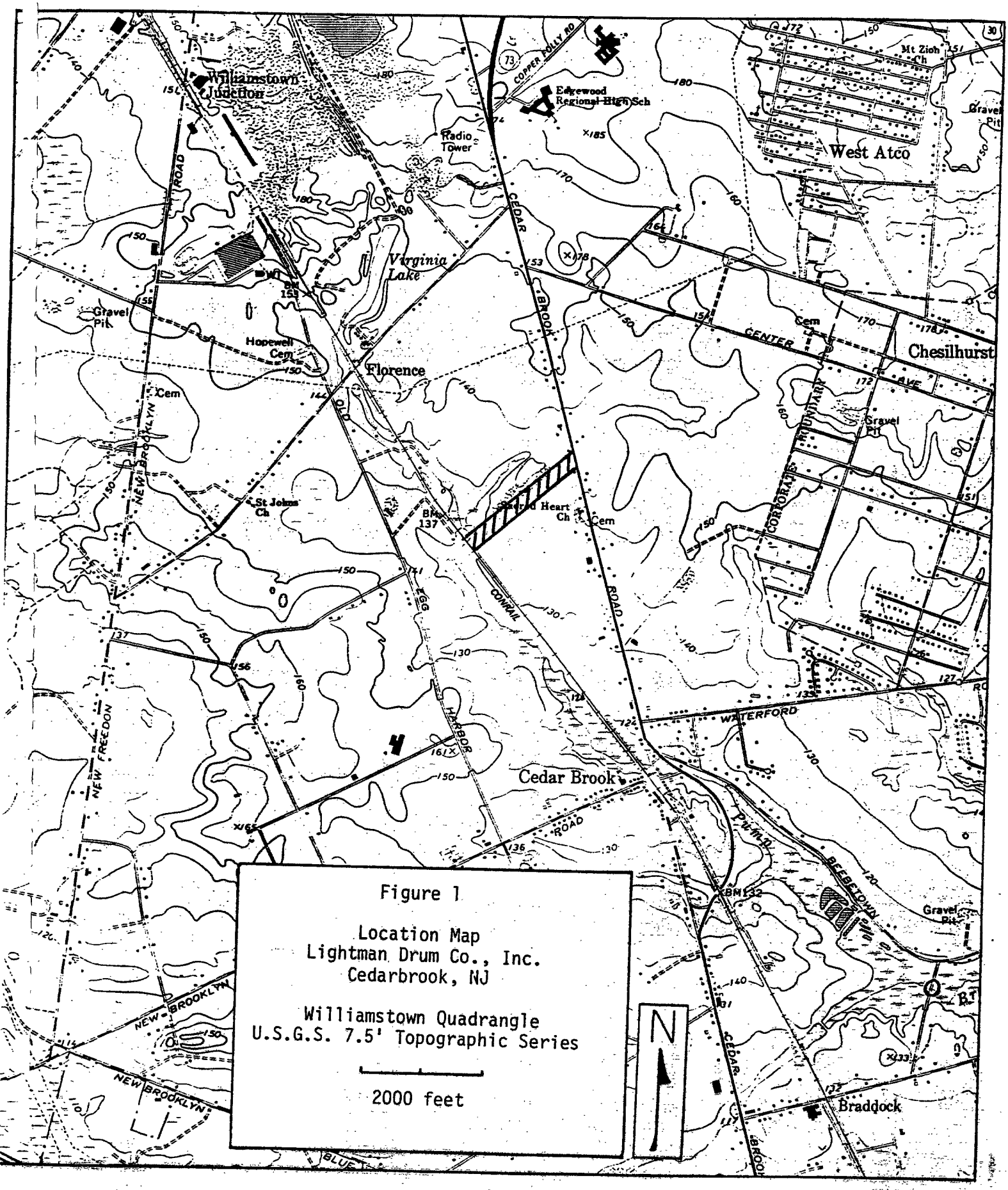

Figure 1

Location Map
Lightman Drum Co., Inc.
Cedarbrook, NJ

Williamstown Quadrangle
U.S.G.S. 7.5' Topographic Series

2000 feet

DEC 1990

FIGURE 2
SOIL SAMPLING LOCATIONS, LIGHTMAN DRUM CO.

LEGEND
- Excavated Storage Tank Area Samples
- Woods Area Samples
- SS Area Samples
- Random Trailer Parking Area Samples
- MW5 Area Samples
- SS-10 Area Samples
- UST Area Samples

North

CAVATED STORAGE TANK AREA:
1-CA3761
DUP 4-CA3766
4-CA4044
8-CA3763
9-CA3896
10-CA3897

WOODS AREA:
1-CA3900
2-CA3901
3-CA3902

S-11 AREA: CA3903

SS-10 AREA:

SHALLOW	DEEP
1-CA3796	1-CA3795
3-CA3765	3-CA3804
DUP 3-CA3791	4-CA3800
4-CA3799	5-CA3790
5-CA3801	6-CA3805
6-CA3803	8-CA3807
8-CA3806	
SS-10-CA3787	
SS-17-CA3788	
SS-7-CA3789	

TRAILER PARKING AREA:
1-CA3764
2-CA3898

MW-5 AREA:
SHALLOW 1-CA3905
DEEP 1-CA3907
SHALLOW 2-CA3904
DEEP 2-CA3906

UNDERGROUND DIESEL FUEL TANK
1-CA3813
3-CA3812
4-CA3815

SS-8 AREA:
1-CA3793
2-CA3794
3-CA3768
4-CA3899
SS-8-CA3755

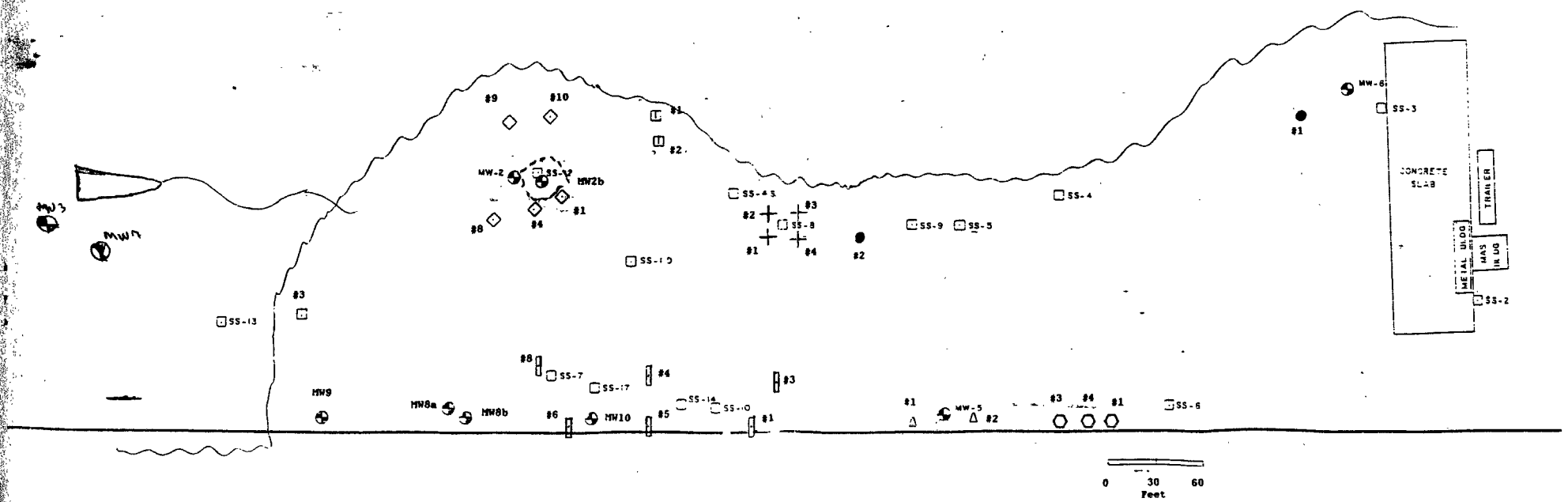

FIGURE 2: SOIL AND GROUNDWATER SAMPLE LOCATIONS

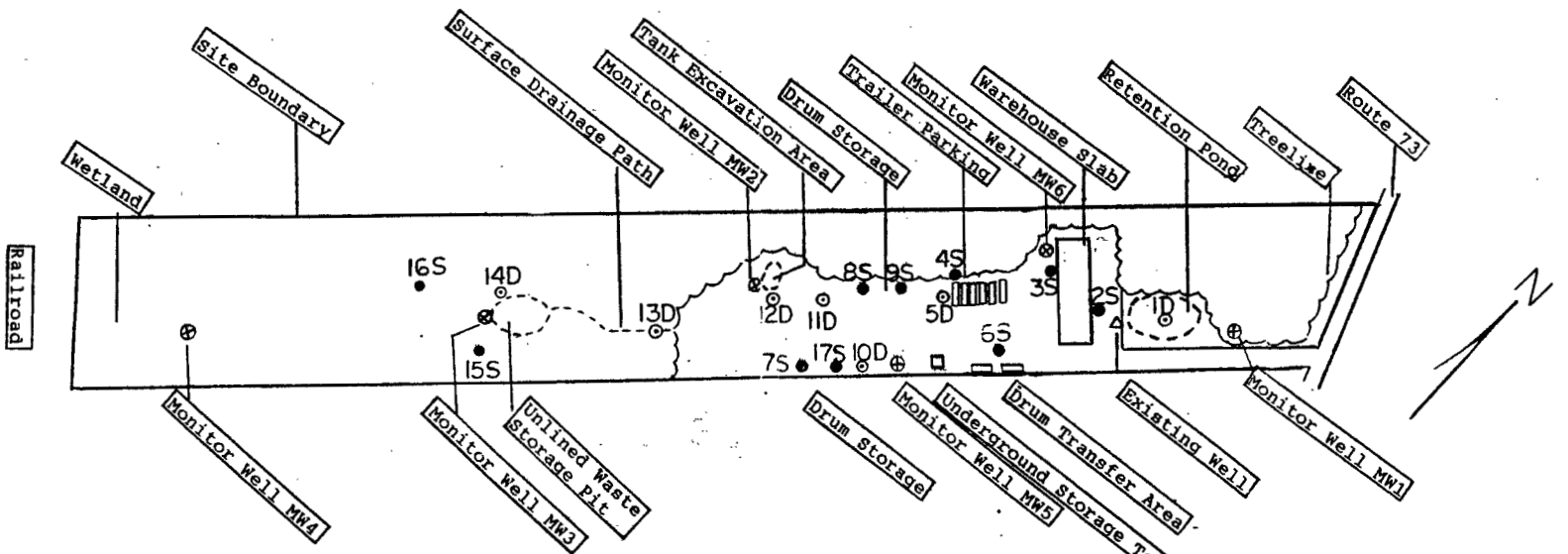

Figure 2

Schematic Site Diagram
Lightman Drum Co.

⊗ Monitor Wells

7S● Shallow Soil Samples

⊙ Deep Soil Samples
1D

Scale: 1" ≅ 200'

INTERNATIONAL EXPLORATION
577 SACKETTSFORD ROAD
IVYLAND, PA. 18974
(215) 322-5250

FIGURE 3: SITE MAP